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JOURNAL OF EDUCATIONAL RESEARCH

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JOURNAL *of* EDUCATIONAL RESEARCH

Volume XXVII MAY 1934 Number 9

AN INSTRUMENT FOR MEASURING GROUP DISCUSSION AND PLANNING

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THE OBSERVATIONAL METHOD

PROGRESS in devising new instruments for measuring aspects of the educative process has been slow in recent years. Many of the research workers have been intent upon refining and expanding the applicability of measuring instruments already devised. For the most part, those instruments which have been refined and expanded have been pencil and paper tests of an objective nature, rating scales, case study techniques, and questionnaires. A new and less used method, however, for measuring aspects of behavior and conduct has been emerging, particularly among research workers in child development institutes. It has been called the observational method.

There are certain aspects of behavior, or conduct, that cannot be measured by tests, questionnaires, rating scales, or case studies. This is particularly true of situations where it is important to observe the natural modes of expression of individuals, unaffected by the instrument of measurement. The observational method offers such means of approach to the analysis and description of certain normal classroom activities. The advantages of the method are: (1) it is a direct method of sampling behavior in actual classroom situations; (2) measurement can be taken without disturbing the usual activities of the pupils; and (3) the data can be treated by conventional statistical formulae. Limitations of the observational method are: (1) norms or standards derived from limited groups and selected situations cannot be generally applied; (2) generalizations and comparisons should be limited to individuals and groups of which they are typical; and (3) the securing of sufficient observations is a time-consuming and costly process, limiting the general application of the method.

Willard Olson[1] was probably one of the first educational workers to use it successfully and to report his findings. Following the work of Olson, a modification of the observational method was tried out by Miss Parten. Florence Goodenough, in reporting the method as applied by Miss Parten, describes it thus:

"Briefly stated, this [method] consists simply in the observation of the everyday behavior of an individual or a group of individuals for definite short periods of time and the recording of the occurrence or non-occurrence of certain specified and objectively defined forms of behavior during each of these periods. The number of periods in which the report is positive for a given individual is treated as his score. Since the number and the length of the observational periods are the same for all individuals, a direct comparison of the frequencies, or scores, is thus made possible. A further requirement is that all individuals be observed under similar conditions, either during the performance of similar activities or when variation in activity is brought about only through free choice of the subject himself. . . . Miss Parten found that forty one-minute observation periods using this method yielded reliability coefficients for the various categories which were not only high but the empirical results were almost in exact agreement with the theoretical predictions from twenty observations by the Spearman-Brown formula."[2]

Dorothy S. Thomas[3] describes the development and use of similar instruments of the observational method for measuring aspects of nursery children's behavior. Percival M. Symonds,[4] also, gives an excellent summary description and bibliography for this method in one of his latest books.

A DEVICE FOR MEASURING PUPIL PLANNING AND DISCUSSION

In the present study, Code 3 for group planning and discussion, which will be described in detail later, was one of the instruments devised to evaluate certain aspects of classroom practice. It is an attempt to measure one aspect, namely, pupil participation in planning the curriculum. As such it is an attempt to evaluate one of the means of securing demo-

[1] Olson, Willard C. *The Measurement of Nervous Habits in Normal Children.* Minneapolis, Minnesota: University of Minnesota Press, 1929.

[2] Goodenough, Florence L. "Measuring Behavior Traits by Means of Repeated Short Samples," *Journal of Juvenile Research,* XII (1928), pp. 230; 233.

[3] Thomas, Dorothy S. *Some New Techniques for Studying Social Behavior.* New York: Bureau of Publications, Teachers College, Columbia University, 1929.

[4] Symonds, Percival M. *Diagnosing Personality and Conduct.* New York: Century Company, 1931.

cratic action; for democracy is predicated upon the proposition of individual participation in group enterprises. One of the most important correlative factors of democratic action is the determination of policies through group discussion and planning. In a sense, then, Code 3 is an instrument for measuring certain aspects and practices of democracy in the classroom. Other codes, measuring other aspects of classroom practices, have been devised. To each of these codes an identifying number, as 1, 2, 3, or 4 has been arbitrarily assigned. These codes are the outgrowth of attempts to make some appraisal of certain experimental practices in classroom instruction of some selected progressive public school systems. These codes are now being developed and validated in this study of experimental practices. The results of this research project, it is planned, will be reported from time to time in educational magazines and monographs.

First, in the evolution of *Code 3: Coöperative Pupil Planning and Discussion*, the procedure followed was to make finding observations. In this procedure the research worker visited a number of classrooms in which he found situations involving coöperative pupil planning and discussion. For a period of three or four days he made sets of running notes, or diaries, of the overt manifestations of such pupil participation. Then these notes were studied and organized into categories similar to those which Code 3 now contains. This tentative code was applied to several situations to see how well it functioned in them. Revisions were made in the light of the experiences gained.

The second major development in the evolution of Code 3 was to use it for directed observations. In this procedure the observer memorized and applied Code 3 in classroom situations until he had attained a requisite degree of skill in its use. For example, when the observer was in an appropriate classroom situation, he coded pupil performance according to the following categories:

CODE 3: COÖPERATIVE GROUP PLANNING AND DISCUSSION

Directions for Use: This code is to be used when a class is planning, reporting, or discussing units of work, problems, or activities. It is not to be used with a question and answer prepared-lesson situation. Code only those pupil contributions that are heeded by the group. Disregard extraneous remarks of a pupil.

Observe the group for the entire period of discussion, if possible. Make an accurate record of the exact number of minutes of the coöperative group planning and discussion. Enter the following codes upon the *data sheet for systematic observations* as instructed:

Prepared voluntary report or exhibit..... 3a

Credit each pupil who participates in the preparation or presentation of a voluntary report or exhibit. Examples are: Pupils who voluntarily and independently, either as individuals or committees, look up information, seek solutions, and make an oral or written report to class; or pupils who construct exhibits, models, etc.; who secure pictures, books, samples, and the like.

Assigned report or exhibit..... 3b

If the teacher or the group assigns a report or exhibit, code such reports and exhibits 3b.

Extemporaneous contribution from real experience..... 3c

Contributions to discussion gained from excursions, trips to the museum, factories, city or country, travel, etc.

Extemporaneous contribution from vicarious experience..... 3d

Contributions to discussion gained from independent reading, pictures, movies, lectures, other persons, etc.

Asking question on the topic, unit, or problem..... 3e

Credit a pupil with code 3e each time he asks a question or seeks information from others on the problem or topic.

Criticism of a contribution: praise or challenge..... 3f

Praising or challenging a contribution of some member of the group, including the teacher.

Suggesting means, methods, activities, solutions..... 3g

Credit a pupil 3g each time he makes contributions in suggesting means, methods, activities, solutions, hypotheses, for the problem, project, unit, or topic.

The observer sat at a part of the room where his presence was as inconspicuous as possible and made his observations in code upon the following form:

DATA SHEET FOR SYSTEMATIC OBSERVATIONS

Teacher..... School..... Observer.....

Date: Mo.-Day-Year			
Minutes Observed			
Type of Work or Activity			
Names of Pupils			
1.			
2.			
3., etc.			

METHODS OF SCORING AND OF TABULATING RESULTS

In scoring Code 3, each contribution of each pupil was counted as one point. Hence, for each code that appeared after a pupil's name one point of credit was given. For example, if five codes appeared after a pupil's name for one day, his score would be five; if eight codes, his score eight; if no codes, his score zero. To secure each pupil's total score for all periods of observation, his daily scores were added together. It may be possible to refine the measuring instrument by weighting different items in the code, but this has not been attempted by the present investigator.

Table I shows a summary of the results of observations in two schools. In school A, seven classrooms were observed; in school B, three classrooms were observed.

TABLE I

COMPARABLE UNITS FOR A DESCRIPTION OF AVERAGE PUPIL PARTICIPATION IN COÖPERATIVE GROUP PLANNING AND DISCUSSION

School (1)	Grade (2)	Pupils Observed (3)	Minutes Observed (4)	Minutes per Pupil (5)	Average Pupil Score (6)	Comparable Units of Discussion (7)
School A	I	24	157	6.54	8.62	1.31
	I	26	138	5.30	8.34	1.57
	II	24	123	5.12	9.29	1.81
	III	26	196	7.53	10.29	1.36
	IV	30	174	5.80	7.43	1.28
	V	33	190	5.75	7.39	1.28
	VI	28	210	7.50	11.42	1.52
School B	II	16	92	5.75	3.04	.53
	III	30	180	6.00	5.10	.85
	VI	21	180	8.57	5.76	.68

The figures of column (5) were obtained by dividing the number of minutes observed (column 4) by the number of pupils observed (column 3). Thus a per capita time of observation was secured, showing to an extent differences in class size in relation to the minutes each class was observed.

Comparable units of average pupil participation in column (7) were secured by dividing data in column (6) by their respective data in column (5). Thus average pupil participation in group planning and discussion was secured in units that allow the average scores of one class to be compared with the average scores of another class.

RESULTS FROM THE USE OF THE DEVICE

The important data for interpretation of Table I are contained in column (7). These are comparable units of average pupil participation.

A perusal of the scores shows that, on the whole, all classes in School A have more pupil participation in coöperative planning and discussion than do the classes in School B. These scores are measures of pupil participation in a quantitative sense; other instruments must be used to measure the qualitative aspects of such pupil participation. For the latter, a rating scale seems most adaptable now. It is, therefore, especially emphasized that the acceptance of pupil coöperation as a desired aspect of education is not to be interpreted as approval of aimless and discursive talking by pupils.

Another approach to the analysis of the data of Code 3 was to compare the percentage frequencies of the occurrence of the items comprising the code. The similarities and differences among the classes in units are presented in Table II.

TABLE II

PERCENTAGE FREQUENCIES FOR ITEMS COMPRISING CODE 3: FINDINGS IN SCHOOLS A AND B

		Percentage Frequencies According to Schools and Grades									
		School A							School B		
	Items of Code 3	IS	IM	II	III	IV	V	VI	II	III	VI
3a.	Voluntary report	5%	1%	4%	9%	8%	6%	6%	6%	7%	12%
3b.	Assigned report	3	0	2	2	10	12	0	0	1	2
3c.	Real experience	7	10	6	12	3	4	8	16	23	14
3d.	Vicarious experience	3	3	3	15	11	12	14	8	21	16
3e.	Question	2	2	8	17	18	5	6	20	7	7
3f.	Criticism	10	8	17	21	18	30	20	14	5	14
3g.	Suggesting means, etc.	70	76	60	24	32	31	46	36	36	35
	Total	100	100	100	100	100	100	100	100	100	100

It is interesting to note the variation of the percent of contributions in each class that appeared as voluntary prepared reports (3a). They range from 1 percent in Grade IM of School A to 12 percent in Grade VI of School B. Few assigned reports appear in the classes. Extemporaneous contributions from real experience (3e) show interesting fluctuations, revealing percentage frequencies averaging about 12 percent in the primary grades but having an average of about 5 percent in the intermediate grades, IV to VI, inclusive. Extemporaneous contributions from vicarious experiences (3d), as one might expect, always show a more or less significant increase after Grade III. The average for the primary grades was approximately 4 percent, for the intermediate grades about 15 percent. Asking questions and criticism of contributions (3e and 3f) vary, showing no particular trends according to grades. However, suggesting means, methods, activities, and solutions for problems

(3g) is the most frequent single item of the code, particularly in the lower grades where the percentage frequency averages about 65. In the upper grades the average is about 35 percent.

If data on a sufficient number of situations were collected, it might be possible to set up certain norms of practice for comparative purposes. Such a proposal would entail many situations and large numbers of pupils for each grade.

STATISTICAL EVALUATION OF THE DEVICE

Qualities in an Observer.—In the administration of the code for group planning and discussion the most important part of the whole process, probably, is the observer; for it is evident that the observer is an essential part of the instrument. On this account it becomes necessary to point out certain capacities that must be possessed by an accurate observer. Following somewhat the suggestions of Symonds, those are listed as minimum essentials of an accurate observer:

(1) Accurate observation through efficient sense organs, particularly visual and auditory;
(2) Attending to subjects, disregarding competing stimuli;
(3) Making reasonably accurate estimates without use of special instruments;
(4) Making fine distinctions, discriminating categories;
(5) Freedom from pathological states, as fatigue, etc.;
(6) Memorizing code and making immediate record in code;
(7) Perception, i.e., interpretations as to significance of sensory data;
(8) Freedom from prejudices so that correct perception may function.

Accuracy of Observations.—The agreement between the scores assigned to pupils in a classroom situation, when these scores have been made independently by several observers on the identical situation, is the best test of the accuracy of observations. Lack of agreement indicates that the categories in the code are ill-defined or that the observer does not possess minimum essential capacities for observing.

After the research worker had trained himself in the use of the code for group discussion, he allowed an assistant to secure a week's training in its application. The investigator and his assistant then went to the same classroom at the same time and observed the same pupil discussion and activity. Each coded the pupil behavior separately, i.e., independently. The results are summarized in Table III.

TABLE III

PERCENT OF AGREEMENT OF TWO INDEPENDENT OBSERVERS USING CODE 3: COÖPERATIVE GROUP PLANNING AND DISCUSSION FOR IDENTICAL SITUATIONS

Class	Minutes Observed	Total Items Coded	Agreement of Independent Observations: Pupils' Total Scores — Number	Pupils' Total Scores — Percent	Individual Code Items — Number	Individual Code Items — Percent
4A	20	50	45	90.0	44	88
6E	25	62	56	90.3	54	87.1

The total scores showed a 90 percent agreement. This degree of accuracy compares favorably with the accuracy reported in previous studies in which the observational method was used. When individual code items, as 3a or 3b, of the two independent observers were compared, they showed 88 percent agreement. Although this degree of accuracy is good, it might be improved by revising and elaborating the definitions of items in the code.

Validity.—Code 3, as an instrument of measurement, purports to show the relative degree to which each pupil helps to plan, to make, and to evaluate certain curricular materials. It is an attempt to show each pupil's personal contributions to coöperative planning in socialized situations in the classroom. Items 3a, 3b, 3c, 3d, and 3g of the code should give evidence of pupil making of curriculum. Items 3e and 3f should give evidence of pupil criticism and evaluation of the curricular material proposed.

In order to provide a more meaningful analysis of Code 3, its correlations with other factors were computed. These correlations are presented in Table IV. None of the factors shows any approximation of being a reliable index for pupil participation in group planning and discussion.

TABLE IV

CORRELATION OF CODE 3 WITH OTHER FACTORS IN CERTAIN CLASSROOM SITUATIONS

Other Factors	Pearson r between: Code 3: Coöperative Group Planning and Discussion — IS	IM	IIS	IIS	IIIM	III	IV	V	VI	VI
1. Mental Age	.12	.26	.17		.29				.46	
2. Chronological Age	—.06	.34	.42	—.30	.33	—.15	.00	.02	.04	.15
3. Sims Socio-Economic							—.11	.51		.00
4. Woodworth-Mathews Personal Data Sheet							—.14	.20	—.37	—.02
5. Code 1: Planning School Control	.54			.51	.63			.62		.70
6. Teacher Rating on Contributions to Class							.48	.37		
7. Teacher Rating on Independent Methods of Work							.40	.27		
8. Teacher Rating on Creative Expression Activities							.27	.22		

Note: In the blank cells of this table data were either not available or not complete enough for computation.

The correlation of Code 3 with other factors, such as mental age, chronological age, socio-economic status, and the like, revealed that no single factor is similar to those characteristics of conduct measured by Code 3. Mental age shows low positive coefficients of correlation, thus indicating a low degree of functionality between verbal intelligence and participation in group planning. Chronological age shows both positive and negative low coefficients of correlation with Code 3. In a like manner, socio-economic status measured by Sims scale shows practically no correlation with Code 3. The Woodworth-Mathews Personal Data Sheet for measuring emotional stability correlates negatively in most situations with scores of Code 3. Code 1, however, which measures pupil participation in planning school and classroom control correlates positively and rather consistently high with Code 3. Since the two codes are measuring similar characteristics of pupil behavior, the high degree of correspondence is not surprising; rather, it is to be expected.

Teacher ratings on pupils' contributions to class plans and discussion do not correlate as high as one might assume that they would. Teacher ratings on independent methods of work and creative expression activities have low correlations with pupil scores on Code 3.

Of all of the factors explored, none shows a sufficiently high coefficient of correlation so that pupil performance on the characteristics measured by Code 3 might be forecast. The best correlation was secured with Code 1, and Codes 1 and 3 measure similar patterns of conduct. Certainly, within the limits of more or less normal groups of pupils, mental age, chronological age, socio-economic status, and emotional stability do not indicate tendencies to vary concomitantly with pupil performance in group planning and discussion.

Reliability.—Code 3 was applied to ten classroom situations. The score on each child for half the number of minutes of observation were paired with his score for the other half; and, so far as possible, alternate days' scores were used in each half. Then the coefficient of reliability between scores of the split-halves of the observations were secured by the Pearson product-moment method. These coefficients were corrected then by application of the Spearman-Brown formula for the self-correlation of a test. The corrected coefficients appear in Table V.

TABLE V

COEFFICIENTS OF RELIABILITY SECURED FOR THE APPLICATION OF CODE 3 TO TEN CLASSROOM SITUATIONS

Grade	Pupils Observed	Periods of Observation	Minutes of Observation	Coefficients of Reliability	P. E.$_r$
(1)	(2)	(3)	(4)	(5)	(6)
I	24	10	157	.89	.028
I	26	10	138	.95	.015
II	16	4	92	.70	.076
II	24	10	123	.84	.041
III	30	10	180	.82	.044
III	26	10	196	.90	.025
IV	30	10	174	.81	.044
V	33	9	190	.60	.071
VI	21	6	180	.94	.015
VI	28	9	210	.90	.023
Average				.84	

Note: The reliability coefficients of Code 3, individually and as an average, compare favorably with most pencil and paper achievement tests.

SUMMARY

New instruments must be devised for measuring aspects of the educative process that are yet unmeasured. The author of this study used an observational method in which certain categories of behavior were defined and coded. When a sufficient number of observations of pupils' behavior in classroom situations involving coöperative pupil planning and discussion was secured, these observations were tested for reliability and validity by statistical methods.

In Code 3 the Coöperative Group Planning and Discussion purports to show the relative degree to which each pupil helps to plan, to make, and to evaluate certain curricular materials. Such aspects of pupil behavior show little functional relationship with mental and chronological age. The characteristics of behavior that Code 3 measures are fairly consistent traits, and the instrument of measurement is reliable. This fact is attested by the average coefficient of reliability of .84, which was secured from the application of Code 3 to ten classroom situations. These classrooms ranged from Grades I to VI, inclusive.

It is probable that this instrument of measurement may be used by the classroom teacher herself to evaluate more accurately the degree to which individual pupils in her class participate in coöperative planning and discussion. It has potential diagnostic and guidance values. Similar instruments may be devised to measure other aspects of the educative process.

THE EFFECTS OF HANDEDNESS ON REVERSALS IN READING

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PURPOSE

THE purpose of this paper is to present the results obtained in an investigation undertaken to reveal the differences in the responses of right- and left-handed children to various types of situations involving skills emphasized in reading or activities closely related to reading. The investigation on the influence of handedness on reversals in reading is but a portion of a larger investigation undertaken by the Bureau of Educational Reference and Research at the University of Michigan for obtaining norms of achievement by children in the primary grades on various types of tests needed in the diagnosis of difficulties involved in the process of reading. On the basis of the data obtained from the larger investigation the subjects were chosen for the intensive investigation of handedness.

This investigation involves 136 pairs of right- and left-handed pupils matched according to the following criteria: (1) sex; (2) chronological age; (3) mental ability as determined by the ratings on the Detroit intelligence tests or on other tests transmuted into terms of the Detroit tests; (4) reading ability based upon teacher's placing of her pupils, often with the aid of standardized tests, in five classifications of readers: very good, good, average, poor, and very poor; and (5) section of a grade with the same teachers in the same school. Thus every effort was made to keep all factors constant except that of handedness. Of these 136 matched pairs, 33 pairs were in Grade I; 55 pairs, in Grade II; and 48 pairs, in Grade III. Eighty-four of the pairs were boys and 52 pairs were girls. Since almost every left-handed child in the ten public schools in Detroit and the two schools in Highland Park in which the tests were administered were used in the investigation, the data corroborate the findings of others that there is a greater proportion of left-handed boys than of girls. The distributions and central tendencies show the right- and left-handed groups were almost perfectly matched on the five factors previously enumerated. The mental and reading achievement in each grade was average, although there was considerable variation in these achievements of the groups.

Especial care was exercised in selecting the pairs to make sure that only cases of pure right- and left-handedness would be chosen. Three criteria were used in determining the handedness of a pupil: (1) the teacher's statement as to handedness; (2) the pupil's statement as to handedness; (3) the results of a battery of handedness tests including the use of each hand in throwing, pointing, drawing designs, writing, cutting with scissors, making crosses on sectioned paper, and in cancelling bars. No child was considered for the investigation who was known to have been changed over in handedness. Neither was any child considered unless there was agreement of teacher and pupil about handedness and unless the responses on six of the seven types of tests for handedness corroborated the teacher's and pupil's statement.

TYPES OF TESTS

In order to throw some light on the influence of handedness on reversals in reading, each group was given five different types of tests especially devised for determining the nature and extent of reversals: (1) in the pronunciation of words in isolated lists or in context; (2) in naming letters; (3) in seeing likenesses and differences in designs, numbers and words; (4) in eye and hand movements; (5) in writing letters of the alphabet, in making the digits from one to ten and in drawing a series of designs from memory.

Reversals in words.—Five different types of exercises were devised for determining the nature and amount of reversals in words: (1) a pronunciation test in which each pupil is asked to pronounce a list of eighty words which might be reversed in pronunciation and which had been arranged in order of frequency of use as given in the Thorndike word list.[1] Examples of these words are *but* when reversed is *tub; are, era; time, emit; evil, live; deliver, reviled.* (2) A test to determine the nature and extent of reversals in words appearing in context. This test consists of two parts: one part containing six isolated sentences in which sixteen of the thirty-six words constituting the vocabulary of the sentence can be pronounced in reversed fashion; the other part consisting of a simple story in which approximately one-fourth of the words can be pronounced in reverse order. Two sentences from the first part will make clear the nature of this test: The *dog saw*

[1] Thorndike, Edward L. *A Teachers Word Book of Twenty Thousand Words Found Most Frequently and Widely in the General Reading for Children and Young People.* New York: Teachers College, Columbia University, 1931.

the *rat* in the *tub*. The boy had a *saw on* the box. (3) A test to determine the nature of the reversal in the responses of choosing the one of four words opposite a picture which tells what the picture is. This test involves thirty different exercises based primarily on pictures representing a series of name words selected from the Thorndike list. The first exercise shows a picture of a house and following the picture are these words: *horse, louse, hose, house*. Note that these words are somewhat similar in word pattern and that the responses should reveal something of the difficulties encountered in making proper responses. The second exercise consists of a picture of a saw followed by the words: *was, saw, sam, sew*. Note that in the second exercise *was*, the reversal of *saw*, is in the list. Many of the other exercises contain the possibility of checking the reversals of the correct response. In all exercises there was the possibility of making analysis of the particular part of the response presenting confusion. (4) A test to determine the pupil's ability to select from a group of four words the one that corresponds to a given stimulus word. To illustrate: the key word, *dog*, is presented and the task is to underline the word, dog, in this list of words: *god, bog, dog, gob*. In this test every exercise contains the reversal of the stimulus word and usually contains other words with reversals of certain letters of the stimulus word. (5) A test to determine the pupil's ability to choose the reversal of a stimulus word. This test is identical with that mentioned under the previous section with the exception that the task is to underline the reversal of the stimulus word instead of underlining the word that is the same as the stimulus word.

Reversals of letters.—Each of the five types of tests designed for determining the nature and extent of reversals in perception and pronunciation of words offers opportunity to determine the tendency for making reversals of letters, but two additional tests were especially designed for that purpose. The first is an oral naming test in which the pupil is asked to name two lists of most often confused letters: one list containing thirty-two lower case letters like b, d, p, q, m, w, and the other a similar number of capital letters like H, K, R, W, M. The second test consists of a number of exercises in which the pupil is asked to underline all letters of a series the same as the stimulus letter. Opposite each stimulus letter is a series of seven letters in which the stimulus letter appears two or three times among other letters that are most often confused with the stimulus letter. The child is told to check all the stimulus letters in each series of letters.

Reversals in matching designs, figures and words.—The first test of this series is similar to the last test of the series just described, except that designs instead of letters are used and the stimulus design appears but once in the series of four designs following the stimulus word. Both complete and partial reversals appear in the list of symbols following the stimulus symbol. The second test consists of presenting in turn a series of pairs of capital letters, or lower case letters, of pairs of two-letter words like *am* and *an*, *me* and *my*, or *ah* and *oh*; of pairs of two numbers like 12 and 21 or 99 and 99; of pairs of three-letter, four-letter, and five-letter words and asks the child to underline all pairs that are alike. This series of tests is designed primarily to measure the pupil's ability to see likenesses and differences, although some of the responses throw light on reversals. A third test in this series measures the pupil's ability to select a given stimulus, two-place numbers from a series of four two-place numbers opposite the stimulus number. One of the four numbers opposite the stimulus number is the number with the digits reversed. This test is similar to one of the tests for selecting a word from a given series of words except that two-figure numbers are used instead of words. The last test in this series is the same as the one just mentioned, except that the pupil is asked to select the number with the digits in reversed order from that in the stimulus word.

Reversals in direction of eye and hand movements.—To throw some light on a possible difference in the eye and hand movements two different types of tests were designed. The first test of this series consists of sixteen objects familiar to a child, arranged in a square with four objects in each row. The pupil is asked to name the different objects and to point to each as he names it. A careful record was made of the responses indicating the hand used in pointing and the order followed in naming the objects. After being confronted with objects in a square—an arrangement which offers the possibility of reading in perpendicular or inclined as well as horizontal fashion—the pupil is confronted in turn with three different cards, each having six familiar objects arranged in a single horizontal row and asked to name the objects. This arrangement on each of these cards was used to show the order of naming when confronted with a single row of objects somewhat approximating the fashion of a row of print. The second test was designed for the purpose of determining the direction of the hand movements in copying some five designs like a square, two intersecting lines, a horizontal line

cut by three perpendicular lines, or drawing the lines for a block capital "H."

Reversals in reproductions from memory.—The first test in this series asks the child to draw some animal like a fish to see whether there is any difference in the direction of the hand movement of the right- and left-handed children and in the direction in which the head of the animal drawn pointed. Other tests consist in having the child print the capital letters of the alphabet or write the digits up to ten in connection with adding or counting activities in which the mind is upon other activities than writing the numbers. The last test in the series consists in exposing for three seconds in turn four different diagrams, like an equilateral triangle having a dot outside the triangle near its base line, and asking the child to reproduce the designs from memory. The reproduction of these designs offered various opportunities for both complete and partial reversals in the direction of the lines in the reproduced designs.

CLASSIFICATION OF REVERSALS

Observation of the responses by the pupils revealed that, while each test was designed for a specific purpose, the possibility existed for much overlapping in the results obtained. To illustrate: The results from the tests designed to determine the number of reversals in reading isolated lists of words or words in context, offered through the analysis of the errors in the responses given almost as good a chance to check the type of letter reversals as did the results from the test designed for that specific purpose. Because of this fact, some of the tabulations present the data concerning reversals made on all tests in the battery except those for determining the direction of hand movements in copying designs from memory, the order of naming objects, the direction of placing a head in the drawing of an animal and those two for determining handedness through the skill manifested in writing and cancelling bars. These enumerated tests aid in diagnosis, but are not concerned with reversals.

Before presenting the tabulation, it seems well to define and illustrate the five types of reversals used in classifying the responses: total reversals, partial reversals, letter reversals, reversals in sequences of words, and digit reversals. By "total reversals" is meant errors in pronouncing words in lists or context like saying *was* for *saw* or *no* for *on* or errors on the test for matching or reproducing designs in which the

design selected or reproduced had lines and details in opposite directions and positions from those in the exposed designs. By "partial reversals" is meant errors in the responses revealing the interchange of certain letters in words like *grab* for *garb* or *sung* for *snug*, responses in matching designs in which the design chosen was in different position from the key design but not entirely reversed position, and in the reproduction of the designs in which the general pattern was correct but with certain lines in reversed direction or other details in reversed positions from those in the exposed designs. "Letter reversals" include the errors in responses to the tests for naming letters or selecting like letters in which the pupil gave *b* for *d*, *p* for *q*, *n* for *u*, *M* for *W*, or in the pronunciation tests in which a letter with a reversed shape was substituted for the letter in a given word, *e. g.*, *put* for *but*, *pig* for *big*. "Reversals in sequence of words" refer to changes in the order of words when reading, *e. g.*, the expression *often they would* as *they would often* or *they often would*. "Digit reversals" refer to all digits made in reverse fashion like the figure 7 with the top drawn in the wrong direction or the figure 3 made with the opening at the right instead of at the left, or all wrong responses showing that the digits in the selected responses were in reverse order or in which one digit of the selected number was the reverse of a key figure, *e. g.*, 21 for 12 in which the order of the digits is reversed and selecting 26 for 29 in which the digit 6 is printed as a 9 upside down.

RESULTS

Table I, exhibiting the number of different types of reversals made by the groups of left- and right-handed pupils on those tests primarily designed for showing such tendencies, reveals that the group of right-handed pupils make more reversals than the group of left-handed pupils. This tendency is especially outstanding in Grade I, but is less noticeable in Grades II and III. The two most frequent types of reversals as may be reasonably expected are "total reversals" and "letter reversals." In these two grades approximately 50 percent of the errors involve total reversals and approximately 35 percent of the errors involve letter reversals. In Grade III the situation is slightly changed as the percentage of total reversals is reduced to approximately 38 percent and the letter reversals increased to approximately 45 percent of the total errors made. The percentage of reversals tends to increase slightly in each successively higher grade. The small proportion of reversals in the sequence of the

TABLE I

TYPES OF REVERSALS MADE BY LEFT-HANDED AND RIGHT-HANDED PUPILS ON TESTS DESIGNED FOR SHOWING REVERSALS

Type of Reversal	Grade I (33 Pairs)		Grade II (55 Pairs)		Grade III (48 Pairs)		Total (136 Pairs)	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
	Number of Reversals							
Total Reversal	365	488	455	446	198	231	1018	1165
Partial Reversal	22	33	63	66	68	90	153	189
Letter Reversal	201	263	374	404	261	249	836	916
Digit Reversal	44	74	20	22	10	1	74	97
Sequence Reversal	0	0	1	0	1	1	2	1
Total	632	858	913	938	538	572	2083	2368
	Percentage of Reversals							
Total Reversal	57.75	56.88	49.84	47.55	36.80	40.38	48.87	49.20
Partial Reversal	3.48	3.85	6.90	7.03	12.64	15.73	7.35	7.98
Letter Reversal	31.80	30.65	40.96	43.07	48.51	43.53	40.13	38.68
Digit Reversal	6.97	8.62	2.19	2.35	1.86	0.18	3.55	4.10
Sequence Reversal	0.00	0.00	0.11	0.00	0.19	0.18	0.10	0.04

words in reading sentences or connected discourse probably has little significance since the number of opportunities for such errors was small because of the limited amount of that type of material in the test.

The distributions of the total number of reversals of all types made by individual pupils as presented by Table II are similar for the left- and right-handed groups of pupils. The means of the distributions for

TABLE II

REVERSALS OF ALL TYPES MADE BY THE LEFT- AND RIGHT-HANDED PUPILS ON ALL TESTS DESIGNED FOR SHOWING REVERSALS

Number of Reversals	Grade I		Grade II		Grade III		Total	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
55–59		1						1
50–54		1	1				1	1
45–49		2	0				0	2
40–44	1	2	0				1	2
35–39	2	0	5	1			7	1
30–34	1	7	2	3	1		4	10
25–29	6	3	3	6	2	2	11	11
20–24	5	8	7	12	4	4	16	24
15–19	7	3	11	12	5	9	23	24
10–14	5	4	9	9	12	16	26	29
5–9	4	0	13	9	19	10	36	19
0–4	2	2	4	3	5	7	11	12
Cases	33	33	55	55	48	48	136	136
Mean	19.62	26.89	17.41	17.59	11.88	12.40	15.99	18.02
S.D.	9.80	12.90	10.90	8.25	6.95	6.40	9.90	10.65
P.E.M.	1.15	1.51	0.99	0.74	0.67	0.62	0.57	0.61
P.E.diff.	1.89		1.23		0.90		0.83	
Difference	7.27		0.18		0.52		2.03	
Diff. ÷ P.E.diff.	3.95		0.14		0.57		2.44	

both groups in the various grades show fewer reversals in each successive grade, but in each grade the mean for the group of right-handed pupils is slightly greater than for the group of left-handed pupils. However, none of the critical ratios is four times the probable error of the difference between the means of the two groups. This fact suggests no certain differences in the responses of the left- and right-handed groups of pupils. The greatest difference between the means of the two groups is in Grade I. No plausible explanation is available for this condition, unless it may be an unverified assumption that teachers, feeling that left-handed pupils may have a tendency to make reversals, exercised more care with them to prevent such responses than with the right-handed pupils.

TABLE III

REVERSALS OF ALL TYPES MADE BY THE LEFT- AND RIGHT-HANDED PUPILS ON SIX READING TESTS

Reversal Errors	Grade I		Grade II		Grade III		Total	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
18–19		2						2
16–17	1	0					1	0
14–15	2	3	2	1			4	4
12–13	2	2	2	1	3		7	3
10–11	2	3	4	4	1	1	7	8
8–9	3	1	9	9	4	7	16	17
6–7	2	7	5	11	6	7	13	25
4–5	7	4	16	15	9	10	32	29
2–3	12	7	12	8	13	16	37	31
0–1	2	4	5	6	12	7	19	17
Cases	33	33	55	55	48	48	136	136
Mean	6.33	7.42	6.13	6.09	4.67	4.75	5.67	5.94
S.D.	4.34	5.14	3.54	3.19	3.40	2.70	3.68	3.73
P.E.M	.51	.60	.32	.29	.33	.26	.21	.21
P.E.diff.	.78		.43		.41		.29	
Difference	1.09		.04		.08		.27	
Diff. ÷ P.E.diff.	1.39		.09		.19		.93	

Table III exhibits distributions of the reversals of all types on six tests, which may loosely be referred to as reading tests: naming lower case letters, naming capital letters, pronunciation of words in isolated lists, oral reading of isolated sentences, oral reading of a story, and selecting of words naming given pictures. These data corroborate the conclusion previously stated that there is no pronounced difference in the responses of the left- and right-handed groups, but the tendency is even stronger in the results of this series of so-called reading tests than on the results of the total series of tests.

More detailed data showing not only the facts concerning the number of different types of reversals made by the groups of left- and right-handed pupils on four reading tests: pronunciation of words in isolated lists, oral reading of sentences, oral reading of the story, and choosing words for given pictures, but also a classification of the errors indicating in which portion of a given word the error occurred and something of the nature of the error made are given in Table IV. This table and its companion table of percentages, not reproduced, reveals no fundamental differences in the responses of the two groups of pupils, although the total number of errors of all types was greater for the right-handed group in Grades I and III and for the three grades taken together.

TABLE IV

NUMBER OF EACH TYPE OF ERROR MADE BY LEFT- AND RIGHT-HANDED PUPILS ON FOUR READING TESTS

Type of Error	Grade I		Grade II		Grade III		Total	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
Total Reversal	85	93	85	84	31	33	201	210
Partial Reversal	18	24	61	58	53	72	132	154
Letter Reversal	50	57	50	58	48	37	148	152
Central and Final Parts	95	131	282	248	190	195	567	574
Final Part	110	154	330	338	279	298	719	790
Beginning and Final Parts	9	44	92	92	47	43	148	179
Beginning Part	85	90	299	215	109	162	493	467
Beginning and Central Part	70	104	128	113	61	64	259	281
Central Part	142	168	610	550	609	598	1361	1316
Sounds Added	36	48	104	108	134	156	274	312
Sounds Omitted	30	36	170	168	181	187	381	391
Words Substituted from Experience	17	50	83	66	60	65	160	181
Other Sounds Substituted	100	108	122	131	46	59	268	298
Total Errors	847	1107	2416	2229	1848	1969	5111	5305

The data in Tables V and VI are slightly different from those given in previous tables in that actual scores made on individual tests are presented. Table V displays the comparative achievement of the two groups of pupils on four tests involving the selecting from four or more given items that one like the key item, *i. e.*, selecting like words, like letters, like numbers, and like designs. The score on each test of this group of tests is the number of correct responses made. Table VI is based upon the results of the test in which the task involved is to underline a pair of given items if both items are alike. This test consists of seven different types of items: capital letters, lower case letters, two-letter words, numbers with two digits, three-letter words, four-letter words, and five-letter

TABLE V

ACHIEVEMENT OF LEFT- AND RIGHT-HANDED PUPILS ON THE FOUR TESTS INVOLVING THE SELECTING FROM GIVEN ITEMS THE ONE OR ONES CORRESPONDING TO THE KEY ITEM

Type of Data	Grade I		Grade II		Grade III		Total	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
Selection of Like Words								
Mean	7.30	9.07	13.29	14.16	19.32	20.54	13.94	14.03
S.D.	4.56	5.58	6.06	5.56	6.86	5.16	7.56	7.16
P.E.M	.53	.65	.55	.50	.67	.51	.44	.41
P.E.diff.	.83		.74		.84		.60	
Difference	1.77		.87		1.22		.09	
Diff. ÷ P.E.diff.	2.13		1.18		1.45		.15	
Selection of Like Letters								
Mean	11.30	11.06	16.38	16.49	21.21	21.13	16.85	16.81
S.D.	7.36	6.88	6.58	6.58	5.12	4.08	7.46	7.04
P.E.M	.86	.80	.60	.60	.50	.40	.43	.40
P.E.diff.	1.17		.84		.64		.58	
Difference	.24		.11		.08		.04	
Diff. ÷ P.E.diff.	.20		.13		.12		.07	
Selection of Like Numbers								
Mean	10.64	9.85	18.09	18.05	23.08	24.17	18.04	18.22
S.D.	6.98	6.98	5.60	6.38	4.76	3.68	7.40	7.86
P.E.M	.82	.82	.51	.58	.47	.36	.42	.45
P.E.diff.	1.15		.76		.59		.60	
Difference	.79		.04		1.09		.18	
Diff. ÷ P.E.diff.	.69		.04		1.84		.30	
Selection of Like Designs								
Mean	10.88	11.91	18.64	18.93	22.04	23.62	17.96	18.88
S.D.	7.54	7.60	6.80	5.86	4.70	3.32	7.66	7.18
P.E.M	.88	.89	.62	.53	.46	.32	.45	.42
P.E.diff.	1.24		.81		.55		.61	
Difference	1.03		.29		1.58		.92	
Diff. ÷ P.E.diff.	.83		.36		2.87		1.51	

TABLE VI

COMPOSITE SCORES MADE BY LEFT- AND RIGHT-HANDED PUPILS ON THE TEST INVOLVING THE MATCHING OF LETTERS, NUMBERS, AND WORDS

Type of Data	Grade I		Grade II		Grade III		Total	
	L-H	R-H	L-H	R-H	L-H	R-H	L-H	R-H
Mean	44.70	40.76	71.91	65.91	90.42	94.58	71.84	69.93
S.D.	22.36	21.04	22.97	23.68	16.58	17.66	27.07	29.54
P.E.M	2.63	2.47	2.09	2.16	1.62	1.72	1.56	1.70
P.E.diff.	3.60		3.00		2.36		2.30	
Difference	3.94		6.00		4.16		1.91	
Diff. ÷ P.E.diff.	1.09		2.00		1.76		0.83	

words. The score on each section of the test is right minus wrong; on the test as a whole, the sum on the individual sections of the test. Only the composite scores are given in Table VI.

The results in these two tables represent additional evidence that no significant differences exist in the responses of the two groups. In 11 out of 16 possible comparisons exhibited in Table V, the achievement of the right-handed pupils is superior, although none of the critical ratios is as high as 3.00 and most of them are less than 1.00. In 3 out of 4

possible comparisons of relative achievement, presented in Table VI, the achievement of the left-handed pupils is superior, but again the critical ratios suggest no certain differences in the responses of the two groups.

TABLE VII

REVERSALS MADE ON TESTS DESIGNED FOR SHOWING REVERSALS BY LEFT- AND RIGHT-HANDED PUPILS WHEN CLASSIFIED ACCORDING TO EYEDNESS

Handedness and Eyedness	Number of Cases	Mean	S.D.	P.E.M.
Left-handed and Left-eyed	63	16.07	9.15	.78
Left-handed and Right-eyed	61	15.28	10.05	.87
Left-handed and Mixed-eyed	12	19.16	12.10	2.36
Right-handed and Left-eyed	45	17.75	11.55	1.16
Right-handed and Right-eyed	83	18.40	10.30	.76
Right-handed and Mixed-eyed	8	15.00	6.60	1.58
Total Left-eyed	108	16.76	10.25	.67
Total Right-eyed	144	17.09	10.30	.58
Total Mixed-eyed	20	17.50	10.45	1.58
Same Handedness and Eyedness	146	17.40	9.85	.55
Opposite Handedness and Eyedness	106	16.18	10.80	1.05

TABLE VIII

CRITICAL RATIOS OF DIFFERENT HANDEDNESS AND EYEDNESS GROUPS IN MAKING REVERSALS ON TESTS DESIGNED FOR SHOWING REVERSALS

Groups Compared	P.E.$_{diff.}$	Difference	Diff. ÷ P.E.$_{diff.}$
Left-handed and Left-eyed with Left-handed and Right-eyed	1.17	.79	.68
Right-handed and Right-eyed with Right-handed and Left-eyed	1.39	.65	.46
All Left-eyed with All Right-eyed	.88	.33	.38
All Left-eyed with All Mixed-eyed	1.71	.74	.43
All Right-eyed with All Mixed-eyed	1.68	.41	.24
Same Handedness and Eyedness with Opposite Handedness and Eyedness	1.18	1.22	1.03

Tables VII and VIII present data on the number of reversals made on the series of tests designed for showing reversals according to handedness and eyedness. The comparisons made possible reveal that the various handedness and eyedness groups respond with approximately the same number of reversals. The critical ratios for combinations of handedness and eyedness are with one exception all less than 1.00, indicating that any existing differences are probably due to chance.

The data obtained from the responses made by the left- and right-handed pupils to the many types of situations provided in the battery of tests used furnished opportunity for numerous other types of comparisons, but the limits of this discussion preclude other than mention of some of the conclusions: (1) In reproducing designs from memory,

the right-handed pupils made a slightly higher number of both correct reproductions and reversals. (2) In reproducing capital letters, the left-handed pupils made more reversals than the right-handed pupils. The greatest difference in the reversals for the two groups was in making capital Z, a letter most often reversed by the left-handed group. (3) In reproducing digits, the right-handed pupils made more reversals than the left-handed pupils. The digit "9" was most often reversed. (4) There is no difference in the achievement of the two groups in the tests designed to measure facility in checking reversals of key words or numbers. (5) The results on the tests involving naming of objects in a square or in a horizontal row revealed that the left-to-right eye habit was almost universally established in both left- and right-handed pupils and that there was no difference in the responses of the two groups in these activities. (6) There was a great variety in the method of responding in the test involving copying designs, but no single method was peculiar to either handedness group, although at times there was evidence that one group showed preference for a given method. (7) There was no relationship between handedness and the direction of facing of animals drawn, as 55.88 percent of pictures drawn by left-handed pupils faced left, 42.65 percent faced right and 1.47 percent faced neither direction; and as 49.26 percent of the pictures made by the right-handed pupils faced left, 45.59 percent faced right and 5.15 percent faced neither direction.

CONCLUSIONS

The one outstanding conclusion derived from the numerous types of comparisons made of the responses given to situations in this battery of tests involving reading or activities closely related to the mental reaction in the act of reading is that handedness *per se* with the two groups under consideration had little or no influence on the type of reading responses made. Left-handed pupils reacted to the various reading situations just as right-handed pupils did. In these two groups of pupils selected maximum attention was paid to obtaining groups of pure handedness. Whether similar results would be obtained with groups of so-called naturally left-handed pupils who had been trained to be right-handed or with groups in which neither left nor right-handedness is dominant, only extensive future investigations can determine.

PRESTIGE, AS MEASURED BY SINGLE-EXPERIENCE CHANGES AND THEIR PERMANENCY

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INTRODUCTION

THERE are many situations wherein it is important to inquire into the most effective methods that can be employed in changing attitudes, and, consequently, to determine whether changes brought about by the methods used have any permanency. Especially interesting are those changes brought about by a single experience.

There have been various studies[1] made into the conditions of attitude changes in addition to studies which deal with changes which may reasonably be called sudden because they result from "single-experience" situations.[2] All of these studies indicate the possibility of causing changes

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in attitudes by such methods as: a course of study, a lecturer, political campaign stimulation, a written statement, moving picture, etc.

But there are no studies available, to the writer's knowledge, on the permanency of changes in attitudes due to a single-experience situation of any kind. The study presented below aims at discovering the permanency of such attitude changes. It deals with communication by print only without verbal instructions.

GROUPS SELECTED

Three hundred and forty-three students pursuing graduate study in educational sociology at Teachers College were used as subjects. They were divided into six sections in the following manner: Sections I and II were equated statistically on the basis of the initial scores on Harper's test, "A Social Study." Each section was composed of members of two distinct class groups. Section III is a group used in a previous study[3] and included here for comparative purposes only. Sections IV, V, and VI are made up by random selection from two class groups.

TEST USED

Harper's "A Social Study"[4] was the test selected for use because of its suitability for educators and because of its high reliability and established validity. The test contains seventy-one propositions dealing with social, economic, political, religious, international and educational problems.

CONDITIONS OF TESTING

The procedure followed in administering the tests the first time to the six sections was strictly according to directions of the author of the test. At the second administration which occurred, in each instance,[5] one week after the first test, new conditions were introduced in order to produce the desired changes in attitudes, either toward a more liberal or more conservative point of view as defined by the author of the test. The special conditions which were set up to bring about these changes in attitudes are now described.

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[3] Arnett, Davidson, and Lewis. "Prestige as a Factor in Attitude Changes," *Sociology and Social Research*, XVI (September-October, 1931), pp. 49-55.

[4] Harper, Manly H. *Social Beliefs and Attitudes of American Educators*. Contributions to Education, No. 294. New York: Bureau of Publications, Teachers College, Columbia University, 1927. The test is printed separately by the Teachers College, Bureau of Publications.

[5] Except in the case of Section III, where there was a four-week interval.

To three of these sections (I, II, III) the Harper tests were distributed together with a separate sheet on which appeared seventy-one numbers corresponding to the seventy-one propositions of the test. Beside each number there was either a plus or minus sign, indicating thereby the *liberal* response to each of the seventy-one propositions. These liberal responses were so distinguished by the author of the test.[6]

One set of these sheets, given to Section I, was introduced by the following statement: "A large number of *lay citizens*, selected to represent typical voters, passed judgment on each proposition of this questionnaire. Their average agreement on the 71 propositions was 98 percent. They marked the items as they are marked below." This section can now be symbolized as "Lay Citizens—Liberal."

Another set of these same sheets, given to Section II, was introduced by this statement: "A carefully selected group of *social scientists* (sociologists, economists and political scientists), as experts, passed judgment on each proposition of this questionnaire. Their average agreement on the 71 propositions was 98 percent. They marked the items as they are marked below." This section can now be symbolized as "Social Science Experts—Liberal."

A third set of these same sheets, given to Section III, was introduced by this statement: "A very carefully selected group of *graduate educators* of maturity and experience, chosen from ten outstanding schools of education in this country passed judgment on each proposition of this questionnaire. Their average agreement on the 71 propositions was 98 percent. They marked the items as they are marked below." This section can now be symbolized as "Educators—Liberal."

These statements were not true but were merely formulated for the purposes of this experiment. The subjects were instructed to read the statement carefully and then to continue with the test. Sections I, II, and III were treated identically, therefore, with the single exception that the authorities referred to in the statements were represented as different.

In order to measure the influence of the mere marking of the propositions alone without any "authority," Section IV was handled in the following manner: All the propositions on the test blanks, given to the students, were marked with the "liberal" response as given by the author of the test. The printed instructions were: "In marking the test will you please put your own plus or minus sign to the left of the one already

[6] Harper, M. H. *Ibid.* pp. 36-38.

there." No further oral or written instructions were given. These blanks will be referred to hereafter as the "liberally prepared" test blanks.

Section V was handled in the same way as Section IV except that all the propositions on the test blanks were marked with the "conservative" response as given by the author of the test. These blanks can now be referred to as the "conservatively prepared" test blanks.[7]

Section VI was used as a *control* section in order to determine what changes would occur on a second testing if no influence at all was brought to bear. To this section was given the sheet containing the items as indicated above but without liberal or conservative markings and without any introductory statement.

The permanency of the changes which occurred was ascertained by administering the same test to Sections I and II eight weeks after the second administration, in the same manner that they were tested the very first time, that is, with no markings and no statements whatsoever.[8]

TREATMENT OF DATA

The number of *conservative* responses made by each individual was used as his score. Means and standard deviations for each section were computed and used for comparative purposes. The technique of the significance of the difference between means was employed. The raw difference between the initial and second means for each section is the measure used to indicate the change in attitude. A smaller mean score signifies a less conservative or a more liberal attitude on the part of the section studied.

FINDINGS

A. *On changes of attitudes.*—Table I presents the means, standard deviations, differences between means and the significance ratio for the initial and second tests for the six sections.

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[7] For example: Item No. 8 reads: "If any facts should be found favorable to socialism they should be omitted from histories written for high school use." On the "liberally prepared" test blanks, this item was marked with a minus (—) sign in the parenthesis preceding the statement; on the "conservatively prepared" test blanks, it was marked by a plus (+) sign in the parenthesis. Similarly for the rest of the seventy propositions of the test.

[8] A period considered sufficient to allow for the forgetting of their original markings. Studies in forgetting show that most of it occurs within a few days. See Ebbinghaus, H. *Uber das Gedachtnise*, Leipzig, 1885, p. 94ff; and Pintner, R. *Educational Psychology*, 1929, pp. 254-261.

TABLE I

CHANGES TOWARD LIBERALISM FOR THE SIX SECTIONS

Section	Number of Cases	Initial Scores: Mean Conservative Score	Initial Scores: S. D.	Second Scores: Mean Conservative Score	Second Scores: S. D.	Changes to Liberalism: Difference between Initial and Second Mean Scores	Changes to Liberalism: S.D.* of Diff.	Diff. / S. D. diff.	Chances in 100
Section I (Lay Citizens—Liberal)	54	17.55	7.86	9.00	6.72	8.55	0.782	10.94	100
Section II (Social Science Experts—Liberal)	54	17.49	8.10	7.77	6.63	9.72	0.873	11.13	100
Section III (Educators—Liberal)	60	18.80	9.36	8.34	7.14	10.46	0.959	10.91	100
Section IV (Liberal Blanks)	73	18.09	6.66	11.37	7.14	6.72	0.510	13.18	100
Section V (Conservative Blanks)	54	19.38	8.97	17.79	11.43	1.59	0.864	1.84	96
Section VI (Control)	48	19.56	8.22	19.62	9.03	0.06	0.508	0.118	55

*In calculating the S.D. of the Diff., the necessary correlation coefficients were computed for the six sections as follows:

Section I = .700
Section II = .578
Section III = .625
Section IV = .782
Section V = .843
Section VI = .921

It will be noted from these data that all the mean scores on the second testing are more liberal except in the case of the control group where the change is practically zero. With the exception of Sections V and VI, all the changes toward liberalism are reliable, since they are all well above three times their standard deviations. It is certain, then, that these differences are true differences and not due to sampling errors. In the case of Section V, there are only 96 chances in 100 that the true difference is greater than zero and in the case of Section VI, there are only 55 chances in 100 that the obtained difference is a true one.

Since there is practically no change for the control group (Section VI), all the other shifts in attitudes noted for all the sections must be due to the experimental conditions introduced into the second testing. The changes for the first three sections occur on approximately 50 percent of the items originally marked conservatively by the group. The conditions under which these changes were brought about measure, therefore, the effect of combining the suggestion of the marked items with the relative effect of the different types of prestige embodied in the three groups mentioned in each of the statements.

From the results on Section IV one sees the effect of the "liberally prepared" test blanks. This factor alone of merely marking the tests beforehand changes the attitude position of the section by 6.72 points toward liberalism. It measures the prestige of liberal markings alone, i.e., minus suggestions of the authorities elsewhere cited. The differences, therefore, between 6.72 (Section IV) on the one hand, and 8.55 (I), 9.72 (II) and 10.46 (III) on the other, may be thought of as due to the added effect of the statements. The values then of authority-prestige under conditions described are 1.83 for (I) lay citizens, 3.00 for (II) social science experts, and 3.74 for (III) educators. Moreover, the inter-differences between 8.55, 9.72 and 10.46 may be thought of as the relative degrees of prestige of the different authorities referred to in the respective statements. If this is true, then educators have exerted the greatest influence, social science experts somewhat less but twice as much as lay citizens. It is interesting to note, however, that even lay citizens had noticeable prestige.

Probably the major prestige of "educators" is due to the educational setting of the testing—the subjects are educators of experience doing graduate work in Teachers College.

Although the shift toward liberalism brought about by the "conservatively prepared" test blanks (Section V) is not statistically significant, yet it may be worthwhile to inquire why there was any change in the liberal direction at all. If the liberal marks served as suggestive influences and caused the subjects to agree with the markings, then the conservative marks served as a counter-suggestive influence causing the subjects to disagree with the markings. This is probably due to the fact that the subjects were too sophisticated and realized that the prepared conservative markings to some of the items were ridiculous. There was engendered, then, a tendency on the part of the subjects to give either the opposite response or a liberal answer to the prepared conservative markings of the test.

B. *On variability of prestige.*—In order to indicate the relative influence of the various factors, a prestige index was formulated as follows:

$$\frac{\text{Median Change}}{\text{First Median}} \times 100 \text{ or}$$

$$\frac{\text{Md. } (x_1 - x_2)}{\text{Md.}_1} \times 100$$

The results are given in Table II for all the subjects of Sections I, II, III, and IV and for the "most liberal" and "most conservative" quartiles of each section.

TABLE II

VARIATIONS IN PRESTIGE INDICES

Section	Entire Group			Most Liberal Subjects			Most Conservative Subjects		
	First Median Conservative Score	Median Change	Prestige Index	First Median Conservative Score	Median Change	Prestige Index	First Median Conservative Score	Median Change	Prestige Index
Section I (Lay Citizens—Liberal)	16.00	8.33	52	9.63	3.80	39	26.00	12.50	48
Section II (Social Science Experts—Liberal)	15.60	9.33	60	10.25	4.67	46	27.00	17.00	63
Section III (Educators—Liberal)	18.60	12.00	65	7.90	5.75	73	32.50	19.00	58
Section IV (Liberally Prepared Blanks)	17.74	6.36	36	10.50	5.00	48	25.50	6.00	24
Sections I, II, III, IV (combined)	.....	....	53	.....	....	52	.....	....	48

From this table, it is seen that, for the group as a whole, the rank order of the various factors in prestige is: first, "educators," second, "social science experts," third, "lay citizens" and last, "liberally marked blanks" without statement. It is striking that for the group as a whole the index for "liberal markings" alone is considerably lower than the indices in the other instances suggesting that this difference is to be accounted for by the additional element to the "liberal markings" of the implications in the terms: "educators," "social science experts," and "lay citizens" as authorities. It is also worthwhile to note that the "most liberal" subjects deviate most markedly from the prestige effects upon the sections as a whole. It is significant that when all the four sections are combined the average change for the "most conservative" and for "most liberal" subjects is approximately 50 percent of the total possible change.

How do the "most liberal" and "most conservative" of the subjects change toward liberalism under the different suggestions? As seen from Table II, the change is greatest for the "most liberal" quartile under the influence of "educators" with a prestige index of 73; that these are in-

fluenced slightly more by "liberal markings" with a prestige index of 48 than by "social science experts" with a prestige index of 46 and least by "lay citizens" with a prestige index of 39. But for the "most conservative" quartile the "social science experts" have the greatest prestige with an index of 63. "Educators" come next in influence with a prestige index of 58 and "laymen" last with a prestige index of 48. The "most conservative" are influenced least by "liberal markings" as seen in a prestige index of 24.

C. *On the Permanency of Sudden Changes in Attitudes.*—For convenience in reading, the scores on the initial and second tests for Sections I and II are repeated together with the results of the third testing and presented in Table III.

TABLE III

RESULTS OF FIRST, SECOND, AND THIRD TESTINGS FOR SECTIONS I AND II

Section	First Time				Second Time				Third Time			
	N	Mean Conservative Score	S. D.	$S. D._m$	N	Mean Conservative Score	S. D.	$S. D._m$	N	Mean Conservative Score	S. D.	$S. D._m$
Section I	54	17.55	7.86	1.069	54	9.00	6.72	0.914	52	11.37	7.41	1.028
Section II	54	17.49	8.10	1.102	54	7.77	6.63	0.902	52	10.11	6.96	0.965

DIFFERENCES BETWEEN THE THREE TESTINGS

Section	Difference between First and Second Means	S. D. of Diff.	Diff. / S.D. diff.	Difference between Second and Third Means	S. D.* of Diff.	Diff. / S.D. diff.	Difference between First and Third Means	S. D.* of Diff.	Diff. / S.D. diff.
Section I	8.55	0.782	10.94	—2.37	0.759	3.12	6.18	0.812	7.61
Section II	9.72	0.873	11.13	—2.34	0.827	2.83	7.38	0.809	9.12

* Correlation coefficients of .700 were used in calculating the S. D. of Diff. These r's were not computed from the actual data but an r of .700 is approximately the average of the computed r's. (See Table I.)

Analyzing the data from Table III, we may say that the change is largely permanent since there is only a slight reversion to the initial position by the two sections. The difference between the second and third means for Section I will, under similar conditions, be at least greater than zero, and therefore, more conservative and the third time while for Sec-

tion II, it may be less than zero and therefore in the opposite direction, or toward liberalism the third time. However, the differences between the first and third means for the two sections are well above three times their standard deviations. It is certain, therefore, that these differences are true differences and that, under similar conditions, the change toward liberalism, noted as a result of the experimental factors introduced at the second testing will persist during an eight-week period—the interval used in this experiment.

The two types of prestige, that of lay citizens and of social science experts, do not seem to exert any appreciable difference in influencing the stability of a change in attitudes. There is a slightly greater permanency in the case of Section II, which was given the statement regarding social science experts.

Whether this change over a period of two months is due to the conditions of the second testing or to other conditionings entering in to influence the attitudes of these students, during the interval between the testings, will have to be determined by further research.

SUMMARY

1. It is possible to cause a shift in attitudes toward the liberalism on approximately *half* of the propositions, which were originally marked conservatively, by manipulating suggestion and prestige in the foregoing manner. The control section did not change.

2. These shifts in attitudes are statistically reliable.

3. The greatest amount of prestige is enjoyed by educators as authorities, for graduate students in education.

4. (a) When items are marked liberally, prestige of print is great enough in the "mere marking" to effect significant changes toward liberalism; (b) when items are marked conservatively, though positive suggestion operates, there may be, however, sufficient counter-suggestion in the "mere marking" to reveal slight changes toward liberalism, though such changes are not statistically significant.

5. For "most liberal subjects" educators have most prestige and lay citizens least; for "most conservative subjects," social scientists have greatest prestige and "mere markings" least.

6. Changes toward liberalism, brought about by statements saying that lay citizens or social science experts "marked the items as they are marked below" and giving the liberal response to all the items, are permanent over a two months period. There was a reversion to conserva-

tism or a loss to liberalism on approximately only 10 percent of these items.

CONCLUSIONS

1. Sudden changes in attitudes can be effected by controlled suggestion through print.

2. Different authorities have different degrees of prestige.

3. The same authorities have varying degrees of prestige under similar conditions for "most liberal" as compared with most "conservative subjects." The findings here would suggest that administrators interested in securing attitude changes of conservative educators toward liberalism might get better results from social scientists than from educators.

4. The permanency of such changes cannot be taken for granted but must be discovered by subsequent testing after a sufficient period to allow for forgetting.

5. Reversion to original attitudes does occur in this instance but only to the extent of approximately 10 percent of the change noted.

THE MEASUREMENT OF ACHIEVEMENT IN ARCHERY*

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Purpose.—THE purpose of this study is to present the results of an attempt to measure achievement in archery. The investigation is based on the assumption that accuracy in archery is a criterion of achievement in that activity. Therefore the scores represent the degree of accuracy or achievement.

The Problem.—At the present time the only available records of achievement in archery are tournament scores, made by expert and experienced archers under highly competitive conditions. These scores represent a high degree of proficiency and skill, and as such may be considered as a measure of achievement. Obviously such scores are not comparable with those made by beginning students in archery. It is therefore necessary for the instructor to establish a new standard of achievement for the inexperienced archer. With this in mind it seems logical to assume that the standard of achievement should be based on the actual performance of a group of students with no previous experience.

Previous Investigation.—Most of the literature of archery is devoted to the historical aspects of the subject, or to a detailed description and analysis of the technic of shooting with the bow and arrow. The writer knows of only one source of information which bears directly on the problem under investigation. This is the study conducted by K. S. Lashley,[1] whose subjects were confronted with the problem of acquiring accuracy in shooting with the bow and arrow by the trial and error method of learning. The degree of accuracy was measured in terms of the distance from the point where the arrow struck to the center of the target. It was found that the general laws of learning operate in the acquisition of skill in archery as in the other acts of skill. Also, there was a "close correspondence between the distribution of practice and the amount of improvement, a given amount of practice being more efficient when distributed through many short periods than when concentrated in a few long ones."

* This study was carried out by the writer under the guidance of Dr. J. Harold Williams, Professor of Education at the University of California at Los Angeles. The writer is greatly indebted to Professor Williams for his generous coöperation and advice, as well as for his interest throughout the experiment.

[1] Lashley, K. S. *The Acquisition of Skill in Archery.* Vol. VII. Publication No. 211 (Washington: Carnegie Institute, 1915), pp. 105-128.

Need for the Study.—The need for objective measurement in the field of physical education is evident to everyone who is concerned with this part of the educational program. Notable progress has been made by Brace, Rogers, Bovard and Cozens, using acceptable statistical procedures. These studies, however, are largely confined to the definition and analysis of fundamental motor ability and general physical efficiency, rather than the measurement of achievement in a single sport.

Many activities included in the physical education program do not lend themselves readily to objective measurement. In this respect, archery has a distinct advantage due to the fact that a numerical system of scoring is used to express the degree of success or failure.

What is required in archery is an objective scale for evaluating the scores that are made by beginning students at stated distances and at the end of a definite period of instruction and practice. A series of norms of achievement based on the performance of beginning archers would meet this need and serve the following purposes:

1. Provide an objective means of grading achievement in archery.
2. Stimulate interest and achievement in archery on the part of the student.
3. Aid in evaluating the efficiency of instruction.
4. Suggest improved methods of instruction in archery.

Results Expected.—The specific results expected from the test procedure outlined in the subsequent pages of this study are as follows:

1. The average score for beginning students in archery for 20 yards, 30 yards, 40 yards, and 50 yards. All are standard distances for women and girls.
2. The average score for beginners in the Columbia Round, a standard event used in archery competition for women and girls.
3. A comparison of the achievement of beginning archers, after a specific amount of instruction and practice, and the achievement of experienced archers.
4. The correlation between achievement in archery as represented by the scores, and height, weight and mental ability of the archer.

METHOD AND PROCEDURE

Subjects.—The subjects used in the investigation were 75 freshmen and sophomore women enrolled in four classes of required physical education at the University of California at Los Angeles during the spring semester of 1931. All were unselected as far as motor ability was concerned. Only students with no previous experience in archery were included in the study.

Administration of the Test.—All classes met twice a week for approximately a thirty-minute period. Due to the University system of scheduling classes the interval between periods was not the same in all four classes under observation. Two classes met on Monday and Wednesday, one on Tuesday and Thursday, and one on Monday and Friday. This difference in the interval between practices made it possible to observe the effect of this factor on achievement.

The equipment used consisted of standard practice bows and arrows of the average quality used for instructional purposes in archery. The bows were of lemonwood 5′ 6″ in length and varied in weight from 22 pounds to 28 pounds. The majority of the bows were 24 pounds in weight. The arrows were cedar practice arrows 26 inches in length.

The ranges included in the test were standard distances shot by women and girls in archery. They were: 20 yards, 30 yards, 40 yards, and 50 yards. Four practice trials of 30 arrows each were shot at each range. The arrows were shot in agreement with recognized archery tournament procedure, each archer shooting six arrows consecutively, termed an "end." Thus five "ends" were shot each day of practice.

Since four practices were required at each distance, and classes met only twice a week, a minimum of two weeks was required for completion of practice at each range. This was somewhat extended at times due to inclement weather, but in no instance was the number of practices reduced or the order of the distance to be shot changed. All four practices at each distance were completed before advancing to the next range.

No additional practice in shooting was permitted either before or after the class period. This was easily controlled due to the inaccessibility of archery equipment away from the University.

Students were asked to coöperate with regard to regularity of attendance so that all practices within each class would be separated by the same time interval. Students who were absent made up the practice missed and followed the same progression as outlined above. Thus each student shot the same number of arrows, the same number of times at each distance in the prescribed order.

The scores for a made-up practice were designated as such on the class score sheet. In this way it was possible to observe the effect on achievement of any irregularity in the interval between practice periods within each class.

Unusual weather conditions, such as presence of strong wind, excessive heat or cold, or any other factor which might influence the shooting

or resulting scores of the entire class were observed and recorded for future use in interpreting the results of the test.

Instruction and exercise in the fundamental technic of shooting preceded the recording of scores for a period of three weeks. Directions were then given for scoring and recording scores. The objective measurement of achievement began at this point.

Method of Scoring.—All scores were made on standard target faces, four feet in diameter, and were scored in accordance with the official rules of the National Archery Association of the United States.

In archery the standard target face consists of a central disc 9-6/10 inches in diameter, and four concentric rings, each 4-8/10 inches in width, painted, respectively, beginning at the center: gold, red, blue, black and white. The target is placed so that the center of the gold is four feet from the ground.

The point values on the target are: gold, 9; red, 7; blue, 5; black, 3; white, 1. An arrow cutting two colors counts as having hit the inner one. Arrows rebounding from, or passing through the scoring face of the target count as one hit and five in value.

Each student recorded her own score on an individual score card, and returned the card to the instructor at the end of the class period. The scores were then checked for accuracy and entered on a class score sheet by the instructor. Thus, a permanent daily record of achievement was on file for each student, and for each class separately.

Final Practice Test.—In addition to the practice periods previously described a final event was selected to retest the ability of the students to shoot the various distances practiced earlier in the semester. The Columbia Round, an official event used in archery competition for women was selected for this test.

The Columbia Round is as follows:

24 arrows at 50 yards,
24 arrows at 40 yards,
24 arrows at 30 yards.

Arrows were shot in four "ends" of six each, and in order listed. The score for this event is the total score made at all three distances.

The Columbia Round was selected because it offered a means of comparing the achievement of beginning students in archery, after a specific amount of instruction and practice with achievement on official record.

namely, Tournament Scores in the Columbia Round.[2] In archery competition the Columbia Round is shot consecutively and requires approximately one hour for completion. Therefore, it is necessary to perform this part of the test outside of the regular class period.

The scores for the group designated as advanced, were the scores made by 35 women who shot in the National Archery Tournament in 1931.[3] The scores for the group of beginners were those made by the 75 subjects included in this study.

Organization and Treatment of Data.—Before making distributions of any kind the scores for each day or practice were reduced to an average score for each arrow shot. There were two reasons for this procedure. First, the wide range of the scores obtained would have necessitated the use of large and unwieldly intervals. Second, the average score per arrow is a more accurate statement of achievement than the total score. The latter is meaningless unless directly associated with the number of arrows shot to produce the score.

Two distributions were made of the scores for each practice or trial: (1) of all scores made on the same day, and (2) of the scores of all students in the class for the same trial. The latter distribution included scores made-up by students who were absent on the day of the prescribed practice.

A comparison of the median scores of these two distributions did not show an appreciable difference in achievement as a result of the increased interval between the practice periods. In most cases wherever any difference existed it was evident only in the second decimal place of the median score. Consequently, all cases were used in future distributions, as the scores represented the same trial even though the interval between practices varied somewhat.

Analysis of the data was made with respect to variability of performance of each class separately for each of the four trials, and at all four distances included in the main part of the experiment. This is not elaborated here but is included in the discussion of results which follow.

[2] The National Archery Association of the United States conducts a National Tournament annually, at which the championship of the United States in Archery is determined. The Columbia Round is one of the events in which women compete in this Tournament. All scores made in the Tournament are published in the National Archery Association Bulletin.

[3] *The Bulletin of the National Archery Association.* The 51st Annual Championship Tournament, Canandaigua, N. Y., August 11-14, 1931. Bulletin No. 171, October 5, 1931.

TABLE I

DISTRIBUTION OF SCORES OF FOUR ARCHERY CLASSES, SHOWING SCORES MADE AT 20, 30, 40 AND 50 YARDS IN EACH OF FOUR TRIALS

Distance	20 Yards					30 Yards					40 Yards					50 Yards				
Trial	1st	2nd	3rd	4th	All Trials	1st	2nd	3rd	4th	All Trials	1st	2nd	3rd	4th	All Trials	1st	2nd	3rd	4th	All Trials
6.5-6.9			1	1	2															
6.0-6.4			1	1	2															
5.5-5.9	2	2	1		5															
5.0-5.4	1	3	2	1	7	1			2	3										
4.5-4.9	6	4	8	6	24			2	1	3										
4.0-4.4	5	8	10	17	40	2	1	2	5	10									1	1
3.5-3.9	5	7	10	15	37	2	7	5	9	23		3	2		5			4	3	7
3.0-3.4	17	18	13	11	59	10	12	13	13	48		4	4	7	15	1	2		3	6
2.5-2.9	11	11	11	10	43	21	18	17	13	69	3	11	12	10	36		1	1	4	6
2.0-2.4	14	10	13	4	41	12	8	14	15	49	11	7	13	13	44	5	13	12	7	37
1.5-1.9	8	9	3	5	25	11	14	10	9	44	17	16	14	19	66	9	14	13	13	49
1.0-1.4	4	2	1	2	9	9	11	7	3	30	26	23	12	16	77	24	17	26	24	91
.5- .9	2	1		1	4	5	4	4	5	18	14	7	14	6	41	21	23	15	17	76
.0- .4			1	1	2	2		1		3	4	4	4	4	16	15	5	4	3	27
N	75	75	75	75	300	75	75	75	75	300	75	75	75	75	300	75	75	75	75	300
Mean	2.97	3.16	3.41	3.47	3.25	2.31	2.38	2.49	2.74	2.48	1.42	1.73	1.78	1.84	1.71	1.07	1.37	1.49	1.57	1.37
S. D.	1.11	1.09	1.15	1.13	1.14	.94	.88	.94	1.02	.96	.60	.86	.88	.79	.80	.62	.69	.78	.88	.77
Md.	2.94	3.13	3.33	3.62	3.23	2.44	2.52	2.54	2.72	2.55	1.38	1.61	1.77	1.81	1.63	1.04	1.28	1.36	1.37	1.26
Q3	3.63	3.88	4.22	4.22	4.07	2.92	3.06	3.13	3.44	3.13	1.87	2.45	2.48	2.44	2.29	1.43	1.87	1.94	1.98	1.82
Q1	2.16	2.33	2.53	2.78	2.42	1.62	1.63	1.83	2.05	1.77	1.01	1.16	1.02	1.27	1.11	.58	.79	.99	.96	.81
Q	.73	.77	.84	.72	.82	.65	.71	.65	.69	.68	.43	.64	.73	.58	.59	.42	.54	.47	.51	.50

Results of the Test.—By far the most important result of the experiment was the establishment of tentative norms of achievement for a typical group of beginning women archers. Table I shows the total dis-

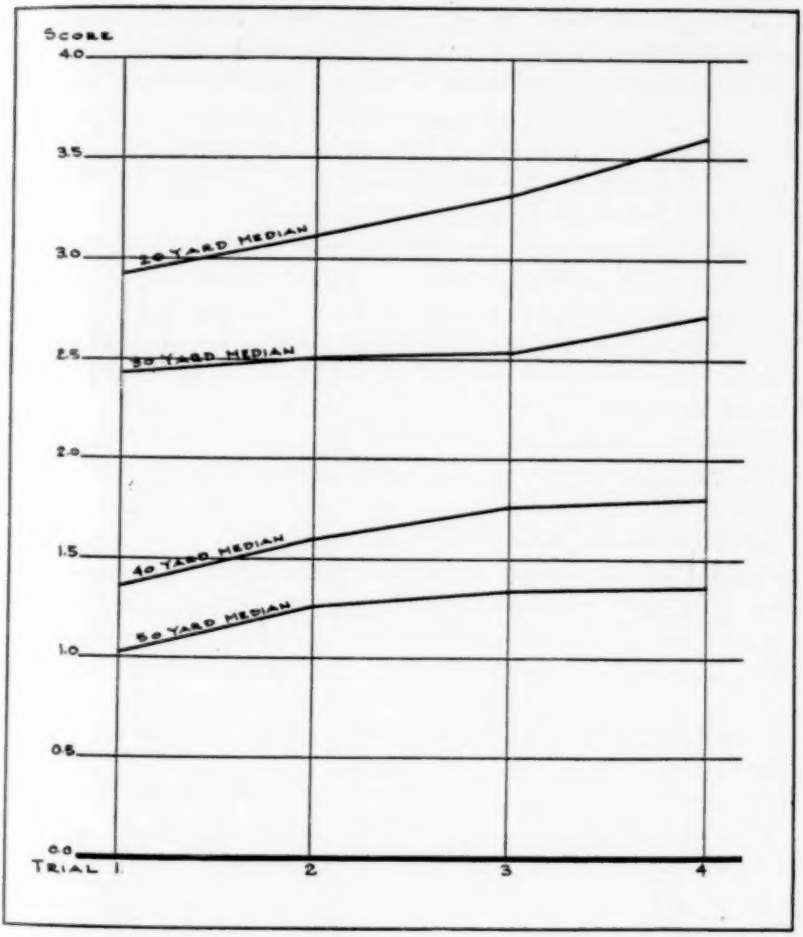

FIGURE I. MEDIAN SCORES FOR FOUR CLASSES IN ARCHERY AT 20, 30, 40, AND 50 YARDS, ON EACH OF FOUR TRIALS

tribution of scores made by all subjects. The results summarized in this table apply only to the achievement of this group under the conditions specified.

It will be noted that the median score for each succeeding trial is greater than the preceding one. This is shown more clearly in Figure I. The existence of this practice effect at each distance is indicative of the typical learning curve.

The fact that there is steady improvement between trials at each distance is probably due to the fact that the amount of practice recorded in the experiment was not sufficient to bring the skill of the subjects near the limit of improvement for that distance. Had practice at each range been prolonged for many trials, there would undoubtedly occur losses in achievement on some of the trials and a general levelling of improvement as the limit of skill was approached at each distance.

Greater accuracy was acquired from the first to the fourth trial at 20 yards than at any other distance. This seems to indicate that there is rapid initial learning in archery as in other acts of skill. The lack of equivalent increase in accuracy at the other distances may correspond to losses in achievement or lack of improvement which would normally occur in the learning curve had all practices been at the same distance for the entire experiment.

This is borne out by the findings of Lashley that in the acquisition of habits necessary for the production of skill in archery, initial progress is quite rapid but all later progress is slow.

In spite of the fact that the distance between the four ranges was the same (10 yards), the levels of achievement represented by the median scores for the four distances are not equally separated, as might be expected. Instead, the medians for 20 and 30 yards are found to be nearer each other, and similarly, the medians for 40 and 50 yards. The difference between the medians for 30 and 40 yards is more than twice the difference between either of the other two.

This leads to the conclusion that the subjects found it more difficult to make the adjustment from the 30-yard range to the 40-yard range than they did to change from 20 yards to 30 yards, or from 40 yards to 50 yards, although the increase in distance was the same in each case. It is possible that this may coincide with a plateau in the learning process, or that it marks a period of temporary loss in accuracy.

Comparison of the median scores of each class separately at each distance included in the test indicated a slight superiority of the two morning classes at both 40 and 50 yards. At the 50-yard range the two morning classes were superior to the afternoon classes on all four trials.

There are two reasons which might explain this apparent superiority of the morning classes at the longer ranges. First, there is the possibility of more general fatigue of the subjects in the afternoon classes as a result of other college work. Greater steadiness and uniformity of the actions involved in shooting are required for accuracy at 40 and 50 yards than at either of the shorter distances. Lashley found that an average variation of two degrees of are in the relative position of the hands results in

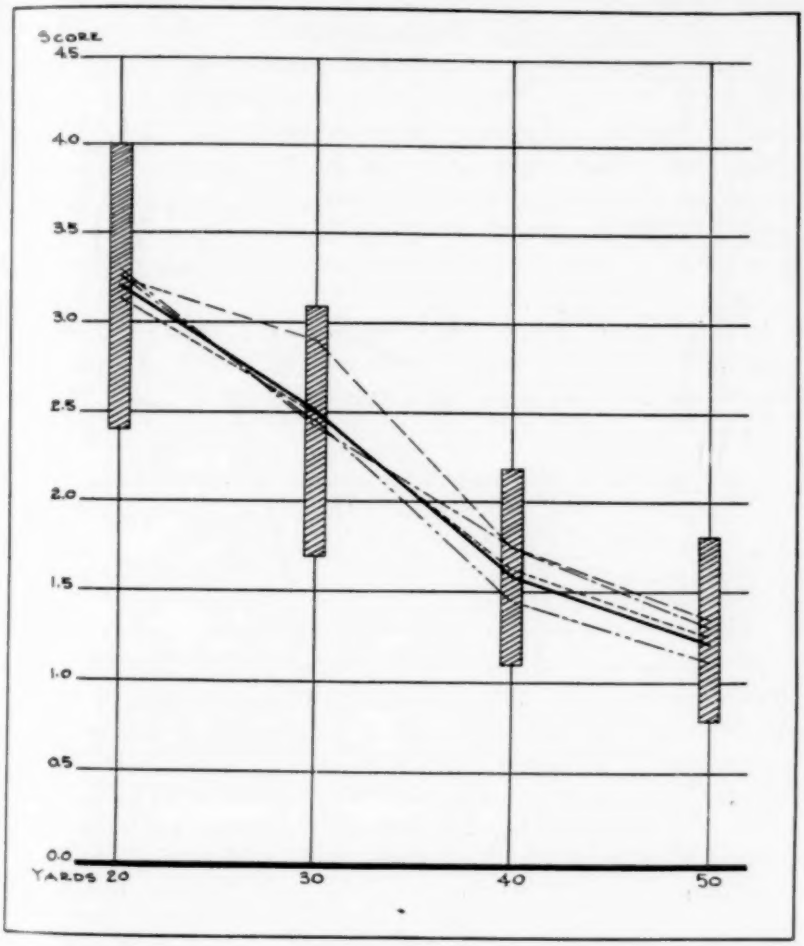

FIGURE II. MEDIAN SCORE AND QUARTILE RANGE FOR FOUR ARCHERY CLASSES AT 20, 30, 40, AND 50 YARDS

an average of 25 inches from the center of the bulls-eye at 40 yards. This is reduced to slightly less than one and one-half degrees at the 50-yard range. In both cases the arrows would miss the target completely.

The second factor which might have caused the afternoon scores to be lower was the fact that there was a noticeably stronger breeze blowing across the range during the afternoon. The effect of wind on accuracy of shooting is much greater at the longer ranges than at the shorter.

The results of the test are summarized in graphic form in Figure II. This chart shows the average median score of each archery class, as well as the combined average and interquartile range of the scores of all subjects, at each distance in the test. The loss in accuracy, as measured by the scores, is clearly indicated as the distance from the target is increased.

Columbia Round.—This event was the final test consisting of 24 arrows shot at 50, 40 and 30 yards, respectively, making a total of 72 arrows in all for the Round. The purpose of the event was to retest the ability of the subjects to shoot at the various distances previously practiced.

A comparison of the median average score per arrow in the Columbia Round with the median average score per arrow made at the same distance during the practice period, is shown in Table II.

TABLE II

COMPARISON OF MEDIAN AVERAGE SCORE PER ARROW IN THE COLUMBIA AND AT THE SAME DISTANCE IN THE PRACTICE PERIOD

Distance	Average for All Trials	Average on Fourth Trial	Columbia Round
50 Yards	1.26	1.37	1.75
40 Yards	1.63	1.82	2.33
30 Yards	2.55	2.72	3.20

In each case the average score per arrow in the Columbia Round is found to be higher than at the same distance in the practice period. This is accounted for in two ways: first, it may be due to the fact that the subjects knew that the Columbia Round was to be considered as a final practical test of their ability in archery, and consequently made a greater effort at this time; second, it is more likely that the increased accuracy is due to the cumulative effect of the previous practice in shooting. It was shown during the practice periods at each distance that there was steady improvement with additional experience. It is interesting to note, however, that achievement was greater at each of the shorter distances in the Columbia Round than at the same distance in the practice

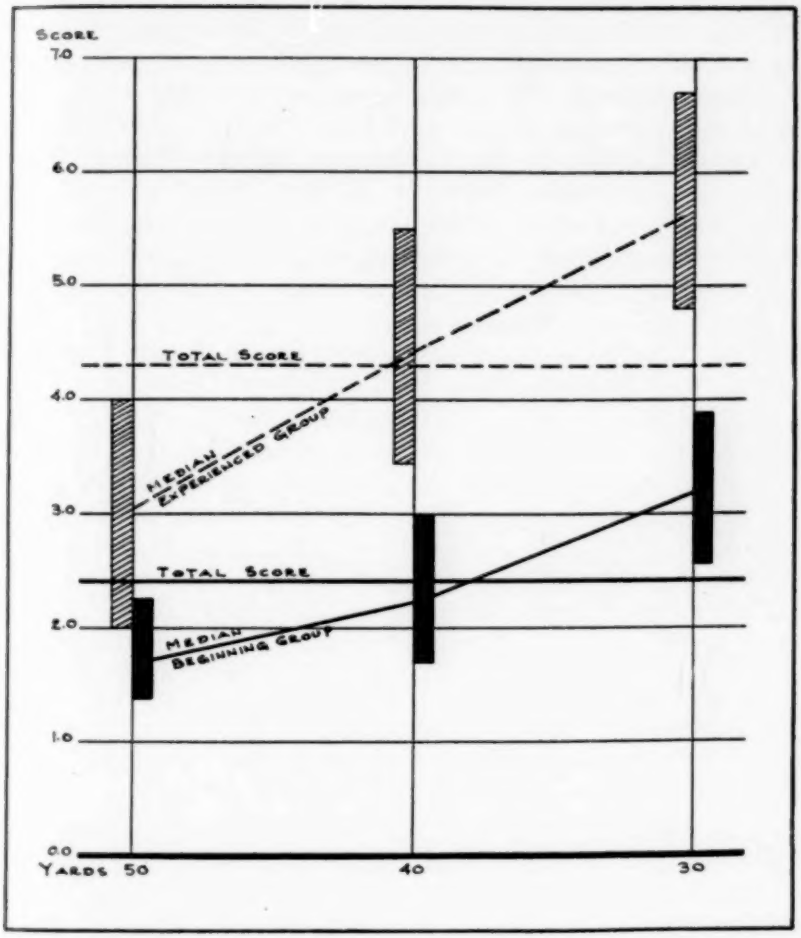

FIGURE III. COMPARISON OF SCORES MADE BY EXPERIENCED AND BEGINNING ARCHERS IN THE COLUMBIA ROUND, SHOWING MEDIAN SCORE AND QUARTILE RANGE FOR EACH GROUP

periods in spite of the fact that the subjects had not shot at 40 and 30 yards for several weeks.

A comparison of the scores of the beginning archers and advanced archers is shown in Figure III. It must be remembered that the advanced archers represent a high degree of achievement in archery. The scores for this group in the Columbia Round are the result of an unlimited

amount of intensive practice in the event, as well as wide experience in shooting, extending in some cases, over a period of many years. The scores made by the beginning archers represent a limited and fixed amount of instruction and practice at the various ranges included in the Columbia Round, and but one practice in the event prior to the final test. Judging from this evidence it is clear that beginning students in archery do not compare favorably with experienced archers in the Columbia Round, under the limited practice conditions provided in this experiment. Experienced archers are far superior to beginning archers at all ranges in this event, and particularly so at the shorter ranges.

The results of the correlations of the scores in the Columbia Round for both beginning and advanced archers are summarized in Table III.

TABLE III

CORRELATION OF SCORES IN COLUMBIA ROUND

	(75 Cases) Beginners	(35 Cases) Advanced
Score at 50 yards and Total Score	+ .82 ± .025	+ .96 ± .008
Score at 40 yards and Total Score	+ .91 ± .014	+ .95 ± .013
Score at 30 yards and Total Score	+ .89 ± .017	+ .93 ± .017
Score at 50 yards and Score at 40 yards	+ .66 ± .044	+ .89 ± .025
Score at 50 yards and Score at 30 yards	+ .64 ± .046	+ .84 ± .033
Score at 40 yards and Score at 30 yards	+ .70 ± .039	+ .82 ± .037

A comparison of the coefficients of correlation of the scores of beginning and advanced archers indicates that achievement at 40 yards in the Columbia Round is the best measure of the ability of beginners, whereas, achievement at 50 yards is the best measure of the ability of advanced archers in this event. The relationship between the scores made at each range is greatest for beginning archers between 40 and 30 yards, and for advanced archers between 50 and 40 yards.

Correlations were made between the height and weight of the beginning group of archers and the total score of the Columbia Round, with the following results: Height and Total Score in the Columbia Round: $r = + .18 \pm .075$. Weight and Total Score in Columbia Round: $r = + .19 \pm .075$. The coefficients are both positive but are so low that while a slight relationship exists between the measures it is too slight to be of significance. Apparently, height and weight are of no importance as far as success in archery is concerned, as measured by the scores made by beginning archers in the Columbia Round. It was impossible to obtain all of the necessary data to make a similar correlation for the group of expert archers.

While not a part of this study, it is of interest to report here the result of an additional correlation made between achievement in archery and mental ability. The semester following the one in which this study was made the Otis Higher Examination was given to all students enrolled in archery classes. The correlation between the scores in this test and the total score in the Columbia Round for 131 students was found to be practically zero.

The absence of any correlation in this case may be due to the fact that the students included in the experiment represent a selected group as far as mental ability is concerned.

Opportunity for further research.—Archery offers many possibilities for additional research in objective measurement. A continuation of this study might include further investigation under three headings: achievement, physiological and psychological relationships, and physical factors.

Under achievement the scope of the test might be extended to include not only beginners in archery, but students with a varying amount of previous instruction and experience. Standardized norms of achievement should be developed which could be used in other schools and colleges where instruction is given in archery.

The influence of fatigue and visual acuity upon success in archery provides interesting possibilities for physiological research. The determination of the fatigue point and point of maximum efficiency in shooting would aid in the establishment of a practice period which would produce maximum skill in archery. The height, weight and strength of the archer with relation to the weight of the bow used and the degree of success attained also comes under this heading. The relationship of intelligence and emotional stability to skill in shooting offers opportunity for psychological investigation which might lead to an analysis of the qualities necessary for success in archery.

Physical factors which influence achievement in archery include the effect of velocity and direction of wind on accuracy in shooting, and the effect of temperature and humidity upon the efficiency of bows and arrows.

Such studies would assist in the classification of students and would provide a more scientific method of evaluating achievement.

SUMMARY AND CONCLUSION

The following general conclusions apply only to the particular results and conditions specified in this experiment.

1. Tentative norms of achievement were established for beginning archers for 20-, 30-, 40- and 50-yard ranges.

2. There was a definite practice effect at each distance. This was shown by the steady improvement in skill from one practice to the next. Apparently achievement in archery follows the customary learning curve.

3. The difference in the interval between practices had no appreciable effect on the scores of beginners.

4. Slightly superior achievement was shown by morning classes than by afternoon classes in this experiment. This variation may be due to fatigue or the effect of increased wind in the afternoon. However these two factors probably should not be overemphasized.

5. Greater achievement was made at each distance in the Columbia Round than at the same distance during the practice period.

6. The limited amount of practice provided in the Columbia Round in this experiment for the beginning students does not compare favorably with the achievement made by experienced archers in this event.

7. There is a high positive correlation between the scores made at each of the three distances included in the Columbia Round and the total score for the event.

8. There was a sufficiently high correlation between the scores made at the three ranges in the Columbia Round with each other, to indicate the existence of a definite relationship between the scores at each distance. This relationship is greatest for beginners between the 40- and 30-yard ranges, and for advanced archers between the 50- and 40-yard ranges.

9. If the Columbia Round is used as a measure of achievement in archery, the scores made at 40 yards are the best measure of the ability of beginners, and the scores made at 50 yards the best measure of the ability of advanced archers.

10. The correlation between height and weight and the score in the Columbia Round was positive but was too small to be significant. Apparently height and weight are neither advantageous nor disadvantageous as far as achievement in archery is concerned.

11. No relationship appears to exist between achievement in archery as measured by the scores in the Columbia Round, and mental ability, as measured by the Otis Test.

A STUDY OF THE FACTORS CONTRIBUTING TO THE UNSATISFACTORY SCHOLASTIC ATTAINMENT OF FIRST YEAR WOMEN STUDENTS

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MUCH thought has been given to the education of the subnormal. Young teachers go out from our colleges, set up ideal situations, and endeavor to lead underprivileged individuals to the limits of their hereditary boundaries. This emphasis on environment for the subnormal is right, but superior persons deserve no less consideration. Gifted students should be encouraged to make the maximum adjustment to environment, but for the sake of society as well as themselves they should be stimulated, also, to make the utmost use of their hereditary endowment. Here is a phase of waste in education which may be minimized by better planning for and advising of high rating students. The reasons for the failure of a considerable number of women students of high scholastic aptitude to do better than average work in college are highly interesting and important.

THE PROBLEM AND SOURCES OF MATERIAL

The purpose of this study is to ascertain causes for the unsatisfactory scholastic attainment of a group of eighty first-year women students, 45 of whom registered in the College of Letters and Science of the University of Wisconsin in September, 1929, and 35 of whom registered in September, 1930.[1] All of these students had a high school psychological percentile rank of 90-100 on the tests given for college entrance.[2] A grade point average of over one point (1.00) in either semester of the freshman year was set as the minimum achievement.

The material was obtained from the tabulations of psychological tests in the Bureau of Guidance and Records, personal records in the office of the Dean of Women, admission blanks in the office of the Registrar, and from personal interviews with the students selected for the study. The data were recorded on guide cards from which significant items were spread on two charts. As the analysis of the problem pro-

[1] Approximately 180 women having a H. S. P. P. R. of 90-100 were registered in the School of Letters and Science in each of the years 1929 and 1930. Median H. S. P. P. R. was 94.6.

[2] *Ohio State Psychological Test.* Columbus: Ohio State University, 1929.
American Council Psychological Examination. Washington: American Council on Education, 1930.

ceeded, twelve special tables, four type group studies, and eight individual case studies evolved. As much as possible of the material is presented here in abbreviated tables and case studies.

DISCUSSION

Human personality is too variable to be irrevocably set down in short terms opposite any heading. Broad generalization, however, permits classification of the data of this investigation into (a) family background, (b) elementary and secondary school experience, and (c) conditions, attitudes and accomplishment in college.

A. *Family Background.*—(a) Thirty-nine of the eighty cases were "only girls" in their families, eighteen of these being the only child. Nineteen were eldest, and nineteen were youngest children, twelve of the eighty being "middle" children. Studies have not shown that only children differ materially from children in families of three or more, but there is evidence that parental indulgence, over-stimulation, lack of competition with other children, and constant effort to meet adult standards tend to make the only child's adjustment to his own age group difficult.[2] An only child, a junior now in the University, said recently, "I feel younger today than I did when I was twelve years old." The only girl has many of the same problems as the only child. If approximately twenty-five percent of the first year women students with high scholastic aptitude do work at a low level, an intensive study of only daughters leads us to inquire:

1. Do parents develop in daughters right mental attitudes toward higher education?
2. Does lack of motive and persistence outweigh high scholastic aptitude?
3. Does even the superior girl expect educational opportunity equal to that of her brother?

(b) In eighteen cases one or both of the parents were deceased. The effect of a broken home was manifest in nervousness, excessive independence, inability to regulate social activities, untidiness, or fatigue caused by home responsibilities.

(c) Of the 160 parents, sixty-six had had some college education. There is no evidence from the study that their influence was more favorable than that of the parents who had had secondary or elementary school education only. (See Table I)

[2] Ward, Anne, *The Only Child*, Smith College Studies in Social Work, I, No. 1, 1930.

TABLE I

Family Background

Place in Family	F	Parents Deceased	F	Parents' Education	F
Only child 18		Father	11	College	66
Only girl 21		Mother	6	Secondary	42
Total	39	Both (1 case)	2	Elementary	30
Youngest	18	Total	19	No data	22
Eldest	10			Total	160
Middle	12				
No data	1				
Total	80				

TABLE II

High School and University Averages

High School Averages		High School Psychological Percentile Ranks		University Grade Point Averages			
				Semester I		Semester II	
Average	F	Rank	F	Gr. Pt. Av.	F	Gr. Pt. Av.	F
95	1	100	5	2.0	1	1.9	1
93	3	99	6	1.9	0	1.8	0
92	4	98	6	1.8	1	1.7	1
91	6	97	7	1.7	0	1.6	2
90	5	96	6	1.6	4	1.5	3
89	5	95	7	1.5	1	1.4	2
88	7	94	4	1.4	1	1.3	5
87	6	93	8	1.3	2	1.2	6
86	8	92	10	1.2	2	1.1	7
85	7	91	9	1.1	1	1.0	12M
84	5	90	12	1.0	14	.9	5
83	6	Total	80	.9	12M	.8	7
82	6	Mean — 94.24		.8	2	.7	4
81	1			.7	15	.6	1
80	4			.6	4	.5	1
79	1			.5	5	.4	3
77	2			.4	4	.3	0
73	2			.3	4	.2	1
72	1			.2	1	.1	2
Total	80			.1	0	.0	16
Mean — 85.6				.0	6	—.13	1
				Total	80	Total	80

B. *School Experience.*— (a) In the elementary school thirty-one students skipped one or two half grades, nine skipped three or four half grades, and two of the eighty skipped five or six half grades. High rating children adjust readily to promotion, but the quality of work done by certain members of this group in the University indicates that too rapid promotion in the grades weakens the foundation and that the effect is far-reaching.

(b) Forty-three students in the group attended thirty-nine Wisconsin high schools, and thirty-four attended forty-nine different out of state high schools. In this connection the most striking effect was found in the case of transfers. Six students who transferred three or four times in high school did not continue beyond the sophomore year in the University.

(c) Types of high school activities reported were: athletic, general and social, literary, music, art, and drama. Undesirable study habits brought about by too many activities in high school carry over into the University. "Activity girls" do not study effectively, are often overstimulated and tired, and frequently find difficult adjustments to make in the University.

(d) Home study ranging from a half hour to four hours daily, was the rule, only two reporting no home study during high school. Sixty students had written term examinations. (Eleven high schools gave no long examinations.) Exemption from examinations was reported by nine students, all of whom expressed disapproval of exemption because "Examinations would have been good practice." Several stated that their limited experience in examinations and independent preparation of assignments in high school had not given them adequate training for the long units of work in the University.

(e) The mean high school average for the group was 85.6, the range 72-95. The subjects giving the most difficulty as shown by high school grades were (in the order named) algebra, Latin, French, geometry, history, physics, English, chemistry, bookkeeping, and Spanish. The reasons given by the students for failure were "illness", "not understood", "uninterested," "too much outside activity." (See Table II.)

Between high school and University fifteen students were out of school one-half to two years on account of employment, illness, needed rest, helping at home, attending technical schools, or travel.

C. *In the University.*—(a) The average age at registration was seventeen years, eleven months; the median being eighteen years, one month. Chronological age was an important factor in five cases, but "immaturity" was marked in sixteen cases.

(b) In this high rating group neither health nor employment in themselves affected the quality of work negatively. Employment at housework, as waitress, typist, saleslady, clerk, tutor, or in caring for children ranged from one to five hours daily. Since students working the greatest number of hours made fair progress, evidently factors other than, or in addition to outside employment were the determining influences. One student employed five and one-half hours a day finished four semesters with grade point averages of 1.6, .8, 1.3, 1.6 respectively. Another student employed four hours daily throughout her four years at the University improved her grade point average consistently from .9 in her first semester to 2. when a senior.

(c) Surveying college residence as a factor in college success, we accept the conclusion that "where comparisons are made between groups of like ability, girls living in rooming houses have lower standings than those in dormitories, coöperative houses, or sororities."[4]

(d) Thirty-seven of the eighty were pledged to sororities in their freshmen year. Rushing and pledging cause emotional stress which it is difficult to separate from the general excitement of adjusting to University life. Not "making a sorority" or holding off for the desired sorority show more disturbing effects than being pledged promptly.

(e) Forty-seven students reported definite purpose in continuing their education, seventeen had a vague purpose, and fifteen had none. For one there was no report, but her marriage during her freshman year and withdrawal from the University accounts for her major interest. Subsequent change of purpose,[5] and in a few cases non-academic aims such as "dancing teacher", "stage work," "aviation" add weight to the belief that many women students have not a definite purpose at the time of entering the University.

(f) The largest number of cases belong to the inconsistent study group. Fifty-nine of these freshmen lacked knowledge of how to study, or were inconsistent in their plan and application. Their time was not budgeted, they "put in time" but did not concentrate, they read slowly and poorly, and did not keep assignments up to date.

(g) In 164 courses the eighty students earned grades lower than C during their freshmen year, history (43 cases), French (32 cases), and

TABLE III

UNIVERSITY DATA

Age at Entrance		Residence			Employment	
			Frequency			
Years	F	Type	Sem. I	Sem. II	Hours daily	F
20	1	Dormitory	25	19	5.5	1
19-7	3	Approved house	33	31	5	2
19	7	At home	16	13	4	6
18-7	7	Private house (Room and Board)	6	5	3	2
18	23	Withdrawn	0	12	2.5	1
17-7	11	Total	80	80	2	2
17	21				1	1
16-7	4				.5	1
16	3				Total	16
Total	80					
Mean — 17 yrs. 11 mos.						

[4] Campbell, Ruth. Thesis, University of Wisconsin, 1931.

[5] Four had transferred to another course before June, 1931. Five others changed their major before January, 1933.

geography (15 cases), leading in frequency. Comparing this with a former study we have made of 179 probation cases, we find again that first-year women students have their greatest difficulty with history and French.[6] Contrary to our finding in the former study, this high rating group had a lower percentage of unsatisfactory grades in English. This suggests that superior language ability may have contributed to high averages in high school.

(h) In the University, the grade point averages of the study group were: First semester, range 0 to 2., median .9; second semester, range −.13 to 1.9, median 1.

Before June, 1931, there were seventy executive actions (probation, advised to withdraw, or dropped) for fifty of the eighty students. Five more such executive actions were taken for this group by December, 1933. This indicates that academic difficulties occurred chiefly in the first two years. In addition to the "probation", "advised to withdraw", and "dropped" actions, there were thirty executive actions relating to adjustment of students. Two were denied readmission, 10 re-entered, 6 reduced programs, 9 transferred to another course or college of the University, and 3 conditions lapsed to failure. This total of 100 ex-

TABLE IV

MORTALITY OF THE GROUP

A.

Year Entered	Number of Semesters Enrolled in the University										Total No. Students
	—1	1	2	3	4	5	6	7	8	9	
1929	2	9	10	2	3	2	1	1	14	1	45
1930	3		9		10	3	3	2	5		35
Total	5	9	19	2	13	5	4	3	19	1	80

B.

Year Entered	No. of Students	Enrolled in the University			Degrees					
					Granted				Probable	
		June 1931	Jan. 1932	Jan. 1934	June 1933	Oct. 1933	Feb. 1934	June 1934	June 1935	Feb. 1936
1929	45	22	†16	* 1	11	1		1		
1930	35	26	‡14	9			1	5	2	1
Total	80	48	30	10	11	1	1	6	2	1

† 2 retarded
‡ 5 retarded
* 1 retarded

[6] Bayliss, Z. B. Executive Actions for Women Students at the University of Wisconsin, 1926-27. Unpublished.

ecutive actions for a group of 80 women students of superior capacity is surprising.

At the end of the first two years, June, 1931, only forty-eight (22 of the 45 who entered in September, 1929, and 26 of the 35 who entered in September, 1930) of the original eighty students remained in the University. A year and a half later, January, 1933, 30 were still enrolled, 16 of whom entered in September, 1929, and 14 in September, 1930. At the present time, February, 1934, nine of the original 80 are still in attendance at this University. Eight are Wisconsin residents seven of whom reside in Madison, and one is an out of state student. (All but one entered September, 1930.) Degrees have been awarded to thirteen of the eighty students; to eleven in June, 1933; one in October, 1933; and one in February, 1934. The nine students who are still in the University expect to receive degrees as follows: June, 1934, six; June, 1935, two; February, 1936, one.

It is reasonable to suppose that some of the 58 who left the University of Wisconsin without completing their work for a degree have continued their education elsewhere. Complete information is not available at this time. It is known, however, that two have attended business colleges, three were certified to other universities, and two received degrees from small colleges. We wonder whether a larger percentage of this group of 80 high rating women should or could have been continued at the University of Wisconsin.

CASE STUDIES

The unlimited number of personality traits and environmental influences that condition the success of each student makes each individual case unique, so that even rough classification is difficult. Four type groups, however, seem justifiable:

1. *Inconsistent Study.*—Students with vague objectives fell in this group. They were uninterested, and having formed poor study habits in high school, neglected their daily preparation, took meager or unorganized notes, avoided the library, studied too little and at irregular or unreasonable hours. Other factors contributing to the failure of students in the inconsistent study group were little experience in budgeting time for study, sleep and recreation; emotional disturbances left over from high-school years or developed by love affairs or difficult adjustments in college; too frequent visits home; and inability to read rapidly.

2. *Outside Employment.*—Apparently the ambitious, healthy student with ability to organize her work, and who does not waste time, need not hesitate to undertake as much as four hours daily employment. Students in this group succeeded in their studies while employed for four hours at reasonable times of day, if the student program was kept at the minimum requirement, and no extra-curricular activities were attempted. The majority were normal girls who must earn their expenses, but among the sixteen employed were found also the over-social type, the plodder, and the neurotic. Lack of system, poor study technic, slow and uncritical reading were noted in most of these cases.

3. *Emotional Disturbances.*—One-fourth of the eighty students studied were included in this type group. Symptoms evident ranged from twitching hands or face to decided neurotic behavior. Five love affairs culminated in marriage before the end of the freshman year. Several students seemed to be suffering from "the pressure of the times." These students rushed from one thing to another, they said they "had no time." They developed superficial methods of work, looking *at* things, rather than *into* them. One girl, seldom in her room at the dormitory, when advised against perpetual motion, replied, "I'm afraid I'll miss something." Individual attention should be given to high strung, overstimulated girls of this type in the critical years of college life when emotional and social adjustments make heavy demands. For this emotional type the prescription varies from happy recreational opportunities to mental hygiene.

4. *Immaturity.*—Sixteen of the eighty students, ranging in age from sixteen to nineteen years, were classed immature. Eleven of them were youngest or "only" children, only two of the sixteen were "middle" children. Three were nervous, four were very shy. Ten lacked interest and ambition, were restless, indolent, unstable, over-social, or thought they preferred business to college. Academic weaknesses were inability to concentrate, to take notes, to organize material, and to budget time. The majority of the sixteen "dated little", making mostly girl friends. Guidance for this type should include (a) instruction in how to study, to organize, to read, and to budget time; (b) social supervision, including help in making social contacts and formulating social standards and ideals.

Eight individual case studies were made. Two of these cases are interesting illustrations of buoyancy and depression.

EVALINA

We present Evalina, only child, vivacious, physically well-developed, gracious, yet with a manner which bore out her personal estimate "I hold myself in no small esteem." Evalina skipped three half grades in the elementary school. She had a high school average of 86.8 from three high schools, one of them European. She entered the University at eighteen with a high school psychological percentile rank of 94.6.

Her parents, living across the continent, were both indulgent, but had different objectives and standards for Evalina. Well dressed, well groomed, with too large an allowance, and one definite purpose "to have a good time", she was rushed by four sororities and pledged one the first week of school. Her interests were "reading fiction, poetry, drama; writing fiction, all recreations, and all sports." No vocational objective nor appreciation of the cultural advantages of a college education and her too easy social success resulted in low mid-semester grades.

Evalina called on the dean. She "felt tired, wanted to go home and talk things over with dad." An exchange of telegrams brought the father's disapproval of the long trip during the semester. Without warning Evalina moved from the dormitory where her parents had selected her room for the year and went to live in her sorority house. Evidences of "the spoiled child" became marked. Her word could not be depended upon, her temper was on the surface, she became careless in dress, cut classes, and failed to keep appointments. She said that she "felt worn out" and her "eyes hurt her at night," she "wanted to drop a subject." She was allowed to drop that subject, but advised that she must attend all other classes. She failed to do so, and before the end of the year was dropped for neglect of University work.

With characteristic irresponsibility she started for home without notifying her parents when she would arrive, nor that she would stop on the way to visit an aunt. Having left no address at her sorority house, the final service of the University was to help her parents locate her.

Inability to cope with the complexities of life when she found herself for the first time on her own responsibility led her to failure. In her wilfulness she felt that her parents had "overstepped their parental authority." Native ability was not lacking, but this young girl, overblest with material comforts, opportunities, and parental indulgence, had never learned to work up to her capacity nor toward any worthy objective, and could not adjust herself to the freedom of a large University.

ENID

And we present finally, Enid, age twenty, phlegmatic, over-weight, unattractive, self-supporting, and earnest, eldest in a family of eight girls. Orientation Week bored her for she knew the campus, thought she knew how to study, did not believe one could be over-studious, and was eager to get her first assignments.

She had worked her way through high school, and was employed by a young housewife who had little knowledge of how long it takes to perform household tasks. Enid worked conscientiously, and obligingly "kept the children evenings" in addition to her four hours of housework, two of which were done before breakfast each day. Every evening she began studying late, finished her assignments at midnight, and then "read for an hour to rest" herself. Her vocational interest was vague. "teaching or secretarial work", she thought, "probably." Her father was a partial invalid and believed little in higher education for girls. She owed it to the family purse to carry the maximum program. She had no interest in activities, nor time for any. Lonely, overworked, vaguely worried, and in poor health, she made lower grades each semester.

During her two years in the University she was given the best possible counseling. Quiet, pleasant, evidently willing to follow advice, Enid sat during conferences either smiling, or looking into space with a fixed stare. At the student clinic every effort was made to improve her health. Her program was reduced and for the last six weeks of her second year she was relieved of all outside work and her expenses paid from the student welfare fund. This financial assistance was given her because of her earnestness, and the probability that a girl with a high school psychological percentile rank of 92 might bring up her grades in two subjects if allowed all her time for study. She finished her fourth semester, however, with minus grade points and was dropped. A year later she reentered the University only to fail again.

SUMMARY AND CONCLUSIONS

A study of their family background, elementary and high-school experience, and conditions and accomplishments in the University shows that the following factors contribute to the unsatisfactory scholastic attainment of first-year women students: place in family; loss of mother or father; frequent promotion in the elementary school; too many high-school activities; exemption from examinations; frequent transfer; mental immaturity; type of college residence; lack of definite purpose; in-

consistent study; emotional disturbances; and over-emphasis of social life. Little effect on success is shown by parents' lack of higher education; by attendance at out of state high schools; early sorority affiliation; or by health and employment if other factors are controlled.

In conclusion, several constructive suggestions rather than definite remedies are offered.

1. High scholastic aptitude as shown by high-school psychological tests does not assure college success.
2. Each case is an individual study and cannot be set in a group except for general diagnosis. Physical, mental, and social information relative to each case should be as nearly complete as possible.
3. High rating students need guidance as well as do those of less ability.
4. Guidance should be personal, friendly, and available at all times.
5. In large institutions where close contact and supervision of students by the faculty is impossible there is need of trained and systematic counselors whose entire time is available for students and their problems.
6. Wise treatment of problem cases should not be the sole aim. A general counseling service, emphasized in the freshman year, undoubtedly reduces the number of problem cases, prevents confusion, and student mortality.
7. Apparent needs in the life of some first-year college women are better technic of study, sufficient and wholesome social life, the stimulation of competitive situations, and an adequate number of fundamental ideals by which to stabilize their thinking.

EDITORIAL

BRIDGING THE GAP BETWEEN THE LABORATORY AND THE CLASSROOM IN THE SCIENTIFIC STUDY OF EDUCATION

The laboratory study of education is based upon the assumption that the gap between the laboratory and the classroom can be bridged. Accepting the more moderate conception of science which holds that the laboratory furnishes not established rules of procedure but cues to better thinking, a question of the first magnitude arises in the field of education: "How is this gap between the laboratory and the classroom to be bridged?"

In the first place, I would like to call attention to the fact that the rules of science are, for the most part, generalizations about the group and are not necessarily applicable to the individuals in the group. This statement is easily verified by examining the data from which generalizations arise. The concluding statements of scientific investigations run somewhat as follows: When everything is considered (i.e. the conditions of the investigation reported) the probabilities are about 99 in 100 that the difference herein reported in favor of the experimental method is a true difference, or some such statement. Such a description may or may not be an adequate description of the group, but it is not a description of individuals. While the generalization may hold for many of the individuals in the group it may not hold for others. Insofar as education concerns itself with individual pupils, teachers, and classes, generalization made about groups whether derived from classroom experimentation or from laboratory experimentation, must be applied to individuals with great care.

A further problem involved in bridging the gap between the laboratory and the classroom in the scientific study of education is that of recognizing appropriate points of application. Suppose that it has been established that distributed practice is better than concentrated practice. Realizing, of course, that this principle has been tested for only a few of the many situations to which it may be applied (this fact may or may not be important according to one's view of the nature of induction), how is

the teacher to recognize appropriate applications? This question entails no particular difficulty so long as one thinks in generalities. But, specifically, by what criteria does one decide upon the applicability of scientific principles? If one shifts the point of view from the teacher to the supervisor, how may the supervisor judge of the extent and effectiveness of the application of scientific principles of teaching? To bridge this gap one should need to recall that validated principles of classroom instruction may be highly subjective. To make the application of experimentally determined principles of classroom instruction more objective one might offer some sort of a definition of each principle in terms of specific teacher and pupil activities and conditions. This can be done but a more difficult problem arises out of the problem of determining whether the activities and conditions essential to an appropriate application of a given principle are or are not present. In this connection it should be recalled that in observing classroom instruction one does not observe principles but activities and conditions, and these are not segregated according to the principles but numerously mixed in the normal flow of classroom instruction.

The problems cited above are merely illustrative of the many problems involved in bridging the gap between the laboratory and the classroom in the scientific study of education. The writer feels confident that this gap can be bridged but it does not follow as a matter of course; neither does it necessarily represent the least difficult of the many aspects of the scientific study of education. Of course the very existence of laboratory studies of education rest upon the assumption that this gap can in a measure be bridged. It is the purpose of this editorial to call special attention to the necessity for giving more attention to the problems involved in bridging the gap between the laboratory and the classroom.

A. S. Barr

REVIEWS

Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.

PERCY, LORD EUSTACE, Editor-in-Chief. *The Year Book of Education, 1933 and 1934* (London: Evans Brothers, Limited, 1933 and 1934), 860 pp. and 950 pp.

The second and third volumes of this annual publication provide a mass of exceedingly valuable data for students of comparative education. The 1933 volume continues and in large part completes an extensive survey of facts concerning education in the British Empire and includes a brief section on education in seven foreign countries. There are highly condensed but practical sections on statistics, finance, educational law, vocational education, elementary and secondary schools, visual and auditory educations, religious education, and school architecture. The discussions though brief are genuinely informing and stimulatingly critical.

The 1934 volume again presents financial and legal data for the United Kingdom and adds to the world survey material of the two preceding volumes. Special features of this volume are chapters on the educational systems of English-speaking nations, brief summaries of the organization of education in about sixty foreign countries, comparative diagrams, a comprehensive survey of secondary education in England and Wales, Scotland, Canada, and the United States, and a study of the textbook situation throughout the British Empire. English reading, internationally minded educationists will hope for the continuance of this publication from year to year as a particularly fine source of information and intelligent comment on education the world over.

M. H. WILLING
University of Wisconsin

BENNETT, ANNETTE. *A Comparative Study of Subnormal Children in the Elementary Grades.* Contributions to Education, No. 510 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. ix + 81.

Administrators, teachers, and other persons interested in the education of subnormal children are indebted to Dr. Bennett for a scholarly investigation which compares two groups of subnormal children in the schools of Baltimore. The study analyzes the school achievement, educational history, physical traits, and certain personality manifestations of a group of fifty subnormal children, aged 12.5 to 13.5 years selected from regular classes and compares the results with similar data secured for an equal number of children of like age and intelligence ratings selected from special classes.

In general, the similarities of the two groups were more striking than their differences. The mean scores in vocabulary tests, for example, differed by only 1.4 words. Ratings on the McQuarrie Test for Mechanical Aptitudes showed no differences. Neither group showed more

weakness in arithmetic reasoning than in arithmetic computation. In agreement with other studies, both groups averaged slightly better in arithmetic age and grade than in reading age and grade.

The results showed slightly better scores in reading, arithmetic and spelling for the grade group. The author points out, however, that it is not possible to determine from the data whether or not this difference may be due to better teaching in the regular grades or to the selection of the children for transfer to the special classes. There is a presumption in favor of the hypothesis that selection may be the answer, since "if special classes were responsible, there would be expected a progressively increasing retardation of special class pupils with additional years of attendance in special classes. Such progressively increasing retardation does not appear."

A factor which may have influenced the achievement of the two groups appears in the finding both for socio-economic and for physical status. Determination of such facts as telephones in the homes, automobiles, and the taking of summer vacations indicated the possibility of a slightly superior status in the case of the subnormal group remaining in the regular grades. On the physical side, while the mean number of physical defects found in the special class group exceeded that for the grade group by only .5 of a defect, there was a marked difference in vision defects reported for the two groups; only 62.5 percent of the special group as contrasted with 81 percent of the grade group having normal vision in both eyes.

To the reviewer, the comparison of academic achievements of subnormal children in special classes and in regular grades is far less important than a comparison of personality traits and behavior. It may be accepted at the outset that such academic proficiency as these children may acquire beyond the barest minimum will be limited at best and will contribute relatively little to their happiness or to determining their employment or their use of leisure in adult life. The attitudes they acquire, however, and the personality traits which they develop are of prime significance.

In this connection, it seems significant that the findings of that part of the investigation which comprised teachers' ratings of the two groups on twenty-five traits, showed superiority of statistical significance for the grade group in only one item, namely, permanence of moods, while the special class group had superior ratings in health, leadership, desire to excel, sympathy and tenderness, desire to know and originality.

It is probably significant that more children in the special classes expressed a preference for active games carried on with other children than did the subnormal children remaining in regular grades.

The author gives evidence of scientific training and conscience in drawing few conclusions from the data assembled, and these are concerned with the need for more careful selection of the children selected for classes and for more care in the matter of remedial health measures and remedial instruction.

The monograph ends by emphasizing the social needs of subnormal children and recommending that major attention be focused on activities which will serve these needs.

ELIZABETH L. WOODS
Los Angeles City Schools

KANDEL, I. L. *Comparative Education* (Boston: Houghton Mifflin Company, 1933), pp. xxvi + 922.

There is a common saying that a man

who uses but one language does not know even his own language. With equal truth, one may say that an educator who studies the schools of but one nation does not know even his own schools. For an understanding of any object is likely to be increased by the study of other objects with which contrasts can be found and comparisons made.

Contrasts and comparisons among school systems are often unfortunate. They are likely to be based upon deficient knowledge of the purposes of different systems, the support, the means for training teachers, the pupils selected for educating, and of the social and political conditions of the localities or nations in which the schools are located. Americans have been told, for example, that, since German boys complete forty-eight years-hours of Latin in their secondary schools, American boys should or could do the same. This assertion is made with deficient knowledge about all the items just mentioned.

The contribution by Dr. Kandel in his *Comparative Education* will enable educators to avoid such errors. He has searched "six of the leading educational laboratories of the world—England, France, Germany, Italy, Russia, and the United States"—for his materials. He has interpreted his findings "in the light of the forces—political, social, and cultural—which determine the character of national systems of education." Essential facts combined with interpretations are presented in a manner which enables the readers to draw contrasts and to make comparisons with profit.

The organization of this volume is effective. General topics, as administration, the training of teachers, and elementary and secondary education, are used as chapter titles. To obtain a comprehensive view of elementary education in all the countries, one needs, therefore, to read but a single chapter. This plan enables the author to make more effective comparisons of conditions in all the countries than is usually the case when the countries are treated serially in successive chapters. For the reader who desires a picture of the general educational plan in a single country, it is necessary, of course, to search through seven different chapters. This longer search would generally be rewarded by the finding of valuable additional information about the work of other countries.

If, as the author contends, educational progress depends upon enlightened public opinion and sound leadership, this volume should be read by all school administrators and public leaders. For all students of the internationalism which has already come to us, the book is essential. Courses in comparative education can, with this compendium, vie with courses in comparative government. Such materials need no defense for either their professional or their cultural values.

WILLIS L. UHL
University of Washington

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

FARNSWORTH, PAUL R. *Studies in the Psychology of Tone and Music*, Genetic Psychology Monographs (Worcester, Massachusetts: Clark University Press, March, 1934), 94 pp.

This monograph contains a number of minor studies in the psychology of tone and music. It contains a discussion of a study of the extent to which similar tonal elements are accepted by three different age groups; musical talent and the left hand; a possible social factor in aesthetic ratings; a note on noise, dissonance, and pleasure; cross rhythms; dyad preferences; the player piano as a possible aid in teaching; the Lipps-Meyer Law; the Seashore and Kwallwasser batteries; and the Kwallwasser-Dykema Music Tests as psychological tools. Bibliography.

KINTER, MADALINE. *The Measurement of Artistic Abilities:* A Survey of Scientific Studies in the Field of Graphic Arts (New York: The Psychological Corporation, 1933), 90 pp.

The author discusses published tests of artistic appreciation, artistic ability, and drawing scales; studies of personality and temperament of artists; investigations now in progress; use of tests in schools and in vocational guidance; problems in need of investigation, and conclusions. Bibliography.

PEEL, RUTH EASTWOOD. *The Effect of Practice upon Individual Differences*, Archives of Psychology, No. 159 (New York: Columbia University, 1933), 54 pp.

After stating the problem, and reviewing previous investigations, the author presents the results of an experimental study of the effect of practice upon individual differences. The subjects were 99 fourth-grade pupils in Public School 165, New York City. Individual differences were found to increase with practice in all tests for both boys and girls when an increased sigma was used as the criterion of an increase in individual differences. When the correlation of initial ability and gross gain was used as the indicator of the effect of practice on individual differences, one test showed a decrease in these differences and the three other tests showed an increase. These results tend to confirm the hypothesis that in simple tasks individual differences decrease with practice, while in the case of more complex tasks they increase. Bibliography.

PIERON, HENRI, AND OTHERS. "Bibliotheque de Philosophie Contemporaine," *L'Année Psychologique*, I and II (Paris: Librairie Felix Alcan, 1932), xx + 480 pp.; 459 pp.

These two volumes present an unusually complete digest of articles, monographs, and books in the field of psychology, not only of work done in France but work done in many countries for the year 1932.

SMITH, HENRY LESTER, AND NOFFSINGER, FOREST RUBY. *Bibliography of College and University Buildings, Grounds, and Equipment,* Bulletin of School of Education, No. 2 (Bloomington, Indiana: Bureau of Coöperative Research, Indiana University, 1934), 199 pp.

A bibliography of 2027 items on college and university buildings, grounds, and equipment. Index.

SOPER, WAYNE W., AND HOLLISTER, FREDERICK J. *The Postgraduate Problem in New York State High Schools,* University of State of New York Bulletin, No. 1029 (Albany, New York: University of State of New York Press, 1934), 41 pp.

After defining the problem, the authors discuss the number of postgraduates, policy of schools in admitting postgraduates, attitude of schools toward postgraduate registration, organization of postgraduate work, load permitted, length of attendance permitted, charges for postgraduate work, effect of postgraduate enrollment upon the school, kinds of courses taken by postgraduates before graduation, etc.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

BURRELL, B. JEANNETTE, AND ECKELBERRY, R. H. "The High-School Question before the Courts in the Post-Civil-War Period," *School Review,* XLII (April, 1934), pp. 255-265.

The authors review the case in which the high-school question has been before the courts in the post-Civil War period. The cases were widespread both chronologically and geographically, and while all but one case grew out of opposition to the high school all were decided in its favor.

COOKE, DENNIS H., AND WHITMORE, B. E. "Subject Combinations in Departmentalized Elementary Schools," *Elementary School Journal,* XXXIV (March, 1934), pp. 526-532.

After studying more than 100 schedules containing the daily programs of 566 teachers in 93 departmentalized elementary schools in 32 states by the use of 68 experts in elementary education, the authors ascertain the most desirable subject combinations.

OTTO, HENRY J. "Pupil Failure as an Administrative Device in Elementary Education," *Elementary School Journal,* XXXIV (April, 1934), pp. 576-589.

The author examines the various aspects of failure concluding that school failure serves no useful values. Bibliography.

EXPERIMENTAL STUDIES OF LEARNING AND TEACHING

FRYER, DOUGLAS. "A Genetic Study of Motivation under Changing Auditory Situations," *British Journal of Psychology,* XXIV (April, 1934), pp. 408-433.

The author reports an experimental study of human subjects over a period of time from which he concludes that the general intent to do a piece of repetitive mental work is highly individual in nature as it is developed through a period of time. Increases and decreases in accomplishment are closely associated with intent to work.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

Payne Fund Studies of Motion Pictures.—The Payne Fund has subsidized a series of twelve studies of motion pictures in relation to youth, under the direction of W. W. Charters and published by Macmillian Company.

"Specifically, the studies were designed to form a series to answer the following questions: What sorts of scenes do the children of America see when they attend the theatres? How do the mores depicted in these scenes compare with those of the community? How often do children attend? How much of what they see do they remember? What effect does what they witness have upon their ideals and attitudes? Upon their sleep and health? Upon their emotions? Do motion pictures directly or indirectly affect the conduct of children? Are they related to delinquency and crime, and finally, how can we teach children to discriminate between movies that are artistically and morally good and bad?

"The history of the investigations is brief. In 1928 William H. Short, Executive Director of the Motion Picture Research Council, invited a group of university psychologists, sociologists, and educators to meet with the members of the Council to confer about the possibility of discovering just what effect motion pictures have upon children, a subject, as has been indicated, upon which many conflicting opinions and few substantial facts were in existence. The university men proposed a program of study. When Mr. Short appealed to The Payne Fund for a grant to support such an investigation, he found the foundation receptive because of its well-known interest in motion pictures as one of the major influences in the lives of modern youth. When the appropriation had been made the investigators organized themselves into a Committee on Educational Research of The Payne Fund with the following membership: L. L. Thurstone, Frank N. Freeman, R. E. Park, Herbert Blumer, Philip M. Hauser of the University of Chicago; George D. Stoddard, Christian A. Ruckmick, P. W. Holaday, and Wendell Dysinger of the University of Iowa; Mark A. May and Frank K. Shuttleworth of Yale University; Frederick M. Thrasher and Paul G. Cressey of New York University; Charles C. Peters of Pennsylvania State College; Ben D. Wood of Columbia University; and Samuel Renshaw, Edgar Dale, and W. W. Charters of Ohio State University. The investigations have extended through four years, 1929-1932, inclusive.

"The committee's work is an illustration of an interesting technique for studying any social problem. The distinctive characteristic of this technique is to analyze a complex social problem into a series of subordinate problems, to select competent investigators to work upon each of the subordinate projects and to integrate the findings of all the investigators as a solution of the initial problem. Such a program yields a skeleton framework, which, while somewhat lacking in detail, is substantially correct if

the contributing investigations have been validly conducted. To provide this framework or outline is the task of research. To fill in the detail and to provide the interpretations are the natural and easy tasks of those who use the data."

Three major conclusions are reached. First, the motion picture is a potent medium of communication. Second, for children the content of current pictures is not good. Third, the motion-picture situation is very complicated. The solution probably is in simply constructed pictures produced for children, with an excellent example already established by publishers of children's literature. Apparently the producers occupy the key position and are obligated in the interest of childhood to make the motion picture a beautiful and kindly servant of youth.

Research Division, N. E. A.—Publications of the Research Division of the National Education Association which have appeared between October 1, 1933, and April 1, 1934, include the following studies:

1. "Current Conditions in the Nation's Schools," *Research Bulletin*, Vol. 11, No. 4, November, 1933. This bulletin reviews the trends in school finance and enrolment from 1926 through the current school year. Reports on closed schools, short terms, and sub-code teachers gathered from 1930 counties distributed throughout the United States are summarized. These data, together with other materials collected by the National Education Association and the U. S. Office of Education, show increasing responsibilities, decreasing resources, reduced services, and continued inequalities in both urban and rural areas.

2. "Five Years of State School Revenue Legislation, 1929-33," *Research Bulletin*, Vol. 12, No. 1, January, 1934. Two types of school tax revenue legislation are described in this report: (a) state taxes which are definitely allocated in whole or in part to public education; and (b) state taxes which make possible significant school appropriations out of a general state fund. Maps and tables indicate the development of sales taxes, income taxes, and other types of taxes as school finance measures. The annual yield from the various taxes is also summarized in tabular form. The bulletin is based upon an examination of state laws enacted during the past five years, and upon the review of school legislation which the Research Division has published annually since 1929.

The Research Division has coöperated in an editorial and consultative capacity with regard to the publications of certain departments of the National Education Association. Current issues of the *Review of Educational Research* published by the American Educational Research Association comprise these titles:

1. "Psychology of Learning, General Methods of Teaching, and Supervision," Vol. 3, No. 4, October, 1933.

2. "The Legal Basis of Education," Vol. 3, No. 5, December, 1933.

3. "Methods and Technics of Educational Research," Vol. 4, No. 1, February, 1934.

Two yearbooks have been published in 1934:

1. The *Twelfth Yearbook* of the Department of Superintendence is entitled, "Critical Problems in School Administration."

2. The *Eighth Yearbook* of the Department of Classroom Teachers was issued in February, 1934, with the title "Teacher and Public: A Handbook of Interpretation for Teachers."

The Educational Research Service, maintained in coöperation with the De-

partment of Superintendence, has issued these circulars since October 1, 1933:

1. "Questionnaire Studies Completed —Bibliography No. 4, 1932-33," Circular No. 12, November, 1933. The list of sixty-three studies presented in this circular is based on questionnaires submitted to city and state superintendents of schools, the results of which have been issued since September, 1932.

2. "Education Discussed in Lay Magazines," Circulars No. 11 and 13, October and December, 1933. These two summaries of articles in non-educational magazines cover the six-months period from June 1 to December 1, 1933.

3. "Scheduling Certain High School Classes for Double Periods," Circular No. 1, January, 1934. Reports from sixty-four high-school principals in cities over 100,000 in population are tabulated according to present practice in scheduling shop and laboratory classes for double periods.

4. "School Books and Supplies: Recent Trends in Expenditures and Policies," Circular No. 2, February, 1934. Replies to a questionnaire sent city school superintendents indicate that 728 cities are spending 34 percent less for school books and 30 percent less for supplies in 1933-34 than they did in 1930-31. An increase of 4 percent in number of pupils in attendance is shown for the same period.

Yearbook of School Law.—The Second Yearbook of School Law, 1934, is a narrative topical summary of decisions of the higher courts in all states of the United States in cases involving school law, as reported during the preceding year. The editor and publisher is M. M. Chambers of Ohio State University, with a postpaid price of one dollar per copy. The thirteen chapters were prepared by specialists in the fields represented. The topics treated are: the rights and obligations of pupils; teachers: certification and appointment, the teacher's contract; teachers: tenure and retirement; district boards and officers; county school administration; school property; school contracts, other than for teaching services; the tort liability of school districts and of school personnel; school district obligations; taxation for public education; the creation and alteration of school districts; state school administration; and institutions of higher education and private schools.

The point of view motivating the preparation of the yearbooks on school law is expressed as follows in the editor's Introduction: "The law is more than a mere craft by which attorneys and judges earn a living. It is in many senses the 'queen of the social sciences.' The shape of our whole social order is constantly being molded by the legislative and the judicial processes.

"Public education is likewise much more than an enterprise which provides employment for teachers and superintendents. Measured by any standard, it is in the long run the most fundamentally important social undertaking in existence.

"Accept the foregoing two premises, and it becomes obvious that the legal basis of education is a strategic sector of the utmost significance. It is alike important for parents who would promote the welfare of children, teachers who would improve their profession, and social scientists who would point the way to a better society."

Research in Employment Stabilization. —The University of Minnesota Employment Stabilization Research Institute, organized in 1931, is conducting studies in

the field of unemployment. There are two broad projects or divisions: the first is a study primarily in the economic aspects of unemployment; the second, in the occupational qualifications and aptitudes of individuals. Each project is under the direction of a committee. A Planning Committee serves to coördinate the work of the two projects. The chairmen of the first and second projects are Alvin H. Hansen and Donald G. Paterson respectively. The Director of the Institute is Russell A. Stevenson. Thirty-six publications of various lengths reporting the findings of the project have appeared. Detailed information concerning the bulletins available may be secured from the University of Minnesota Press.

Child Development and Parent Education Conference—On June 19, 20, 21, 1934, the eighth Iowa Conference on Child Development and Parent Education will be held in Iowa City, Iowa. The conference is sponsored by the Iowa State Council for Child Study and Parent Education with the coöperation of the Iowa Child Welfare Research Station and Extension Divisions of the State University of Iowa, Iowa State College of Agriculture and Mechanic Arts, and Iowa State Teachers College.

The conference program will present some of the issues of the new educational deal. It is open to all persons interested in studying children. No admission fee will be charged for any of the conference sessions.

Teachers of Mathematics—At the Cleveland Meeting of the National Council of Teachers of Mathematics, J. O. Hassler, University of Oklahoma, was elected president.

The National Council, which had a very modest beginning in Cleveland, Ohio, February, 1920, when approximately seventy-five members (charter members) created the organization, has now grown to a membership of many thousands, including every state in the union and some twenty foreign countries.

Rating of Graduate Schools.— The American Council on Education in the fall of 1932 appointed a Committee on Graduate Study under the chairmanship of President R. M. Hughes of Iowa State College to study the following problems:

1. Should an attempt be made to prepare a list of graduate schools offering adequate facilities for work in the various fields? If so what procedure should be followed?

2. What organization should assume the duty of maintaining a record of all doctorates conferred?

3. Suggest the place and function of the Master's degree.

4. Should there be a professional school for college teachers on the graduate level, other than the present graduate school? If so, what degree should be conferred?

5. Suggest the relationship of scientific instruction on the graduate level in a professional school to scientific instruction in the graduate school.

6. Suggest the most desirable and valuable relationship which should exist between institutions of research and graduate schools.

In preparing a list of graduate schools the following procedure was followed:

1. A list of fifty fields of knowledge in which it seemed possible to study the graduate work was prepared. The study as concluded covered only thirty-five fields.

2. A list of the fifty fields was sent to the dean of the graduate school of every institution known to be offering

work for the doctorate. The dean was requested to check the fields in which graduate work for the doctorate was offered, to indicate the number of doctorates conferred in the last five years, and to submit a list of the graduate faculty in each field. The responses of the deans varied in accuracy and comprehensiveness.

3. From the reports of the deans, supplemented by study of catalogues, lists of institutions offering graduate work for the doctorate in each field were prepared, complete so far as the information went.

4. The secretary of the national learned society in each field was requested to provide a list of one hundred well-known scholars distributed, as far as possible, among the various special branches of the field.

5. To each of these scholars was sent a list of all the institutions offering work for the doctorate in the field with their respective graduate staffs in the field. Each scholar was requested to check those institutions which in his judgment had an adequate staff and equipment to prepare candidates for the doctorate; and to star the departments of the highest rank, roughly the highest 20 per cent.

6. The returns from these scholars were summarized, and those institutions accorded a star by the majority voting were placed in the starred group; those checked by a majority, but failing of a majority of stars, were placed in the group of those adequately staffed and equipped.

The Committee recommends that the Council in coöperation with the National Research Council prepare a complete annual list of doctorates conferred.

Recommendations concerning the improvement of the Master's program are:

1. Students should not be admitted to study for the A. M. without evidence of good undergraduate preparation in the specific subject in which they propose to take the degree.

2. The course should be planned in advance with some unity of purpose and coherence in arrangement.

3. Most of the courses should be of a more advanced type than ordinary undergraduate courses, and at least one should be of the seminar type, with some training in methods of graduate work. Assistants should be provided to aid the professor in supervising the work of the students by holding individual conferences with them.

4. The requirement of a thesis, if rightly administered, is of great value in training the student. This thesis should not be required to be a contribution to knowledge.

5. Graduate students should be allowed great freedom in class attendance, but there should be a solid final written examination for the degree of an intensity and breadth appropriate to the standard of a year's work beyond the bachelor's degree.

The committee of the Council endorses the findings of the Committee of the American Association of University Professors on College and University Teaching with regard to teacher training for college teachers.

The report recommends that departments within professional schools doing graduate work should be departments or units within divisional organizations of the graduate schools, with such instruction administratively regulated by the graduate school.

The Committee emphasizes the desirability of close relationship between universities and other research institutions, although the degree granting function is

properly the responsibility of the university.

A bulletin of the Council under date of April, 1934, reports the findings of the Committee on Graduate Instruction, as does the *Educational Record* for April, 1934.

Philadelphia Research.— The annual report of the Philadelphia Division of Educational Research and Results for the year ended June 30, 1933, summarizes the investigational activities of the year in methods of organizing instructional groups, in devices for individualizing instruction, in specific diagnoses of group and individual difficulties, and in analyzing essential conditions of effective pupil progress through the grades of the school system. The major activities of the Division are reported currently throughout the year in a series of mimeographed and printed bulletins which are the basis for professional discussion among teachers, principals, supervisors, and superintendents, and for planning subsequent remedial teaching. Most of the activities of the Division are on a coöperative basis. Teachers and principals work with the Division in determining significant interpretations of course of study requirements, in the selection of items and skills to be tested, in the experimental administration of tests, and in the revision of experimental forms.

The Division staff is made up of a director, four professional assistants, and seven clerical assistants.

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